

**THE
RAILWAY GAZETTE**

A Journal of Management, Engineering and Operation
INCORPORATING

Railway Engineer • TRANSPORT • The Railway News

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CONTENTS

| | PAGE |
|---|------|
| Editorials | 217 |
| Letters to the Editor | 221 |
| The Scrap Heap | 222 |
| Overseas Railway Affairs | 223 |
| Underpinning and Strengthening Track | 224 |
| Recent Locomotive Rebuilding on the Central Uruguay Railway | 225 |
| Air Raid Damage at St. Pancras Station, L.M.S.R. | 230 |
| Railway News Section | 231 |
| Personal | 231 |
| Transport Services and the War | 233 |
| Stock Market and Table | 240 |

DIESEL RAILWAY TRACTION SUPPLEMENT

The September issue of THE RAILWAY GAZETTE Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price 1s.

NOTICE TO SUBSCRIBERS

Consequent on further paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list which will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and facilities for such dispatch.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

REDUCTION IN SIZE OF PAGE

To economise in paper our readers will observe a slight reduction in the size of THE RAILWAY GAZETTE in that the size of the page has been reduced from 9 in. x 12 in. to 8½ in. x 11½ in. The type area of the page remains the same, namely, 7 in. x 10 in., but the surrounding margins have been reduced. This of course detracts from the appearance of the paper, but is one of the exigencies of the war

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:

Mondays to Fridays 9.30 a.m. till 5.30 p.m.

The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

Private Enterprise and Collective Security

SIR FRANCIS JOSEPH in a recent broadcast put forward a trenchant defence of private enterprise in the government of industry. The position that Sir Francis Joseph has long held as a leading industrialist—he is a director of the London Midland & Scottish Railway Company, the Midland Bank, and a number of other companies, and was recently appointed Acting Chairman of the United Kingdom Commercial Corporation—comes at an opportune time. The problems of the post-war years are now being approached from many angles, although the discussion has been more in the realm of abstract principle than on the plane of practical policies. From the summary of the broadcast, which is given at page 237, it will be noted that Sir Francis in supporting private enterprise uses the phrase in a wide sense, and in full recognition of the inevitability of some measure of Governmental control for a long time after the war. The main point made in the broadcast was that in the post-war period the use of private enterprise would help to prevent chaos, because it would get things done, and get them done more cheaply than the State; it did the job while the Government and committees would be talking about it. On the other hand, as a correspondent stated in our columns last week, it seems probable that in the post-war era competition will not be competition between this and that company or even between this and that industry. Such competition as there is will be competition between nations in which the whole process of manufacture, from the collection of the raw material to the sale of the finished article, will be scientifically organised to an extent that will not permit of competitive rates or even of competing services within the nation itself. Thus the future of the railways is envisaged as functioning as part of a vast network of transport covering both land and sea, and which in itself will be no more than one of a number of factors co-ordinated in the national effort. It can be argued, of course, as our correspondent showed, that total commercial effort will prove to be as dangerous to the world as total warfare, in the sense that one will lead to the other.

Wages are Profits

Sir Francis Joseph also had some welcome remarks to make on the subject which too often these days has become the butt of many who are more politically acute than industrially competent. He pertinently asked why working on a profit-making basis should be viewed with contempt or suspicion, and he gave some illustrations of how the profits of private enterprise have played their part, both in the finance of the present war and in that of 1914-19. He pointed out too, that the guiding principle of every trade union leader was how to secure more for his men, and drew attention to the fiction of terming the increased reward of workers "wages" but the higher return to employers "profits." In his view, the Government should inspire private enterprise to beat previous records. This would ensure the Government of taxes which would maintain social services and to help the distressed to get to work again after the war. Governments in trade did not get value for money, because they lacked the experience which private enterprise had to pay for in tears and sweat. His advice was that private enterprise was a service which should be used in reorganising the post-war world. It might be controlled, as wisdom and experience suggested, but to refuse its aid would inevitably add to the difficulties which would have to be faced.

Curtailment of Cheap Travel Facilities

It has been reported recently in the daily press that a considerable curtailment in cheap travel facilities is to be put into force in the very near future. So far no announcement has been made, but in all the circumstances of the times it would appear not unlikely that the rumours which have gained currency are well based. As long ago as our February 20 issue it was pointed out that one step which was taken in the last war to reduce travel, and which so far has not been put into effect during the present struggle, was the abolition of all cheap tickets, including monthly return tickets. It is not known whether so sweeping a change is contemplated at present—it is more probable, indeed, that certain facilities cheaper than the standard fares, will remain in being—but there is one point in an alteration of railway fares, such as that which is reported to be impending, which merits attention. It will be recalled that the Government has declared against a policy of general increases in the price of transport; that indeed was one of the reasons for the existing financial agreement with the railways. Nevertheless, in the announcement made by the Chancellor of the Exchequer on the stabilisation of transport charges, he dealt with the subject on a general basis, and it could hardly be held that the abolition of cheap fare facilities would be a violation of the principles he then set

forth. A reduction in cheap fare facilities would not affect the general basis of charges.

Overseas Railway Traffics

With a view to some appreciation of the results obtained in English money by the British-owned railways in Argentina, the accompanying table now shows their traffic receipts converted into sterling at a rate approximating the figure at which remittances to this country are officially sanctioned by the Argentine Government. In the 7th and 8th weeks of the current financial year the largest increase shown is that of £41,507 on the Central Argentine, which in the corresponding weeks of the previous year secured an advance of £40,075. On the Buenos Ayres & Pacific the gain of £9,937 in the 7th and 8th weeks of this year compares with an advance of £20,062 in the same two weeks a year ago, and on the Buenos Ayres Great Southern the corresponding increases have been respectively £17,187 and £17,000. The Buenos Ayres Western, which in the 7th and 8th weeks of the 1941 year showed an advance of £14,750, records an improvement of £7,250.

| | No. of week | Weekly traffic | Inc. or decrease | Aggregate traffic | Inc. or decrease |
|------------------------------|-------------|----------------|------------------|-------------------|------------------|
| Buenos Ayres & Pacific* | 8th | 86,375 | + 7,750 | 662,750 | - 5,437 |
| Buenos Ayres Great Southern* | 8th | 133,125 | - 1,030 | 985,052 | - 1,875 |
| Buenos Ayres Western* | 8th | 48,562 | + 1,500 | 375,937 | - 3,052 |
| Central Argentine* | 8th | 128,812 | + 17,891 | 953,131 | - 123,088 |
| Canadian Pacific | 34th | 939,203 | - 9,200 | 31,476,200 | + 4,977,800 |

* Argentine traffics calculated at 16 pesos to the £

United of Havana traffic is on improving, and the increase for the eight weeks of the present year has reached £155,764.

Post-War Building

On another page we give a condensed report of the opening conference on the building industry and post-war building at the Institution of Civil Engineers. Civil engineers have always considered, to some extent at any rate, that the building of all types of structures was their concern; yet for many generations the civil engineer has been little concerned with ordinary buildings, because their construction depended chiefly on tradition and craftsmanship, and the design and control of all ordinary building have become the province of the architect. But of late years, as building has become more scientific, it has become largely a question of engineering, and therefore the civil engineer believes that he should have a share in the design. With the cessation of hostilities and the very great amount of building that will be necessary, this question of the design and supervision of building becomes of great importance to the civil engineer; hence the present conferences at the Institution of Civil Engineers. Even in wartime construction there has been a certain amount of competition between architects and civil engineers as to their appropriate share in design and supervision. Civil engineers are realising the growing importance of the building industry, and because of the colossal magnitude of building that must be done after the war, the problem whether ordinary building is a branch of civil engineering or a separate industry becomes of great importance. These conferences on the building industry will not only help to clear the issue as to the appropriate domains of engineer and architect, but, we hope, will do much to bring about that collaboration between all branches of the building and civil engineering industries and professions which is vital to efficient reconstruction after the war.

The Reichsautobahnen in 1941

In accordance with the provisions of the Reichsautobahn law and its executive order dated May 29, 1941, the German motor roads were detached from the Reichsbahn administration and placed under the Generalinspektor für das Deutsche Strassenwesen (Inspector-General for the German Roads) as from January 1, 1941. Their only connection with the Reichsbahn now is in respect of financial and accountancy matters. According to a recently-issued report of the Reichsautobahnen in respect of the year 1941, the construction of extensions and of further branches and links in the road system is being continued, notwithstanding the difficulties of the supply position. Despite the curtailment of private motor traffic in Germany, the allocations from the mineral oil tax paid by motorists and the motor vehicle tax in favour of the Reich motor roads increased to RM. 215,490,000 in 1941, as compared with RM. 198,000,000 a year previously. The increase of working expenditure was RM. 13,320,000, against an increase of RM. 12,430,000 in 1940. The total book value of the road system was given as RM. 5,235,000,000 at the end of 1941, against RM. 4,714,000,000 a year previously. Stores are shown in the balance sheet at RM. 35,950,000 (against RM. 23,100,000), and claims at RM. 130,650,000 (against RM. 115,820,000). With a view to covering the expenditure in connection with the development of the system, a loan was obtained from the Reichsstock für Arbeitseinsatz, a kind of

German pool for working purposes; RM. 3,300,000,000 had been paid from that pool to the Reich motor roads up to the end of 1941, and it is expected that a further sum of RM. 250,000,000 will be borrowed shortly.

Kenya & Uganda Railways

The services operated by the Kenya & Uganda Railways & Harbours Administration in 1941, as shown by the report recently received from Mr. A. E. Hamp, the Acting General Manager, produced the substantial surplus of £865,450 from the railways, road transport, and lake steamers, after providing for all expenses and loan charges, compared with £331,787 in 1940. Total tonnage increased by 19.3 per cent. and ton-miles by 16.3 per cent., and the fluctuating nature of the demands added materially to the difficulties of coping with this heavy volume of traffic. Wagon shortage was intensified by the necessity to use many covered goods bogie wagons for the movement of troops, prisoners of war, third class passengers, and live stock, but every effort was made to achieve a more rapid turn-round, and in spite of a shorter average wagon journey, mileage per wagon for the year rose from 14,790 to 15,974. More and smaller trains had to be run so as to keep the wagons moving, and the necessity to save coal and use wood fuel involved the use of smaller engines with reduced train loads. Some financial results of the railway, road, and steamer services are compared in the following table:—

| | 1940 | 1941 |
|----------------------------------|-------------|-------------|
| Passenger receipts | 292,779 | 462,214 |
| Public goods receipts | 2,184,752 | 2,672,015 |
| Gross earnings | 2,627,089 | 3,330,428 |
| Working expenses and renewals | 1,762,161 | 1,964,972 |
| Miscellaneous transactions (net) | Cr. 112,909 | Cr. 143,870 |
| Net revenue | 977,837 | 1,509,326 |

Ordinary working expenditure in 1941, apart from renewals, was £1,594,591, against £1,396,738, and the operating ratio improved from 53.17 per cent. to 47.88 per cent.

Railway Welding Still Expanding

We have on previous occasions commented on the development of welding as a manufacturing and repair process in railway shops, both for locomotives and rolling stock. This process is constantly expanding and also being improved and indeed it has been called the most important of present-day methods. That perhaps is going rather far, but even so, it remains true that welding ranks at least as high as any other method employed for this class of work. Although still in its infancy it was adopted by railway mechanical engineers, as a solution of many of the repair problems with which they were faced, but more recently it has taken its place as an indispensable aid in the reclamation and repair of locomotive and rolling stock parts that would in earlier years have found their way to the scrap heap. In America especially welding is going rapidly ahead, and both passenger and freight vehicles, streamlined and conventional, are now assembled as almost completely welded structures. An all-welded locomotive boiler also has proved so successful in nearly five years of operation that permission has been granted for the construction of more of these boilers when the plant facilities of locomotive builders, now engaged in defence work simultaneously with their locomotive building, can be used for erecting them. Welding is replacing built-up riveted structures and steel castings. Flame-hardening of parts subject to wear is being tried out on a number of American railways and offers interesting possibilities.

Firebox Conditions

There is little clear-cut knowledge as to exactly what happens in the firebox of a coal-burning locomotive, and it is by no means impossible that a considerable amount of misconception exists as to the conditions and movements between the grate bars and the tubeplate. The gas velocities above the brick arch are very high, and C. A. Brandt, of the (American) Superheater Company, has given them as 260 m.p.h. above the end of the arch, 70/90 m.p.h. through the combustion chamber, and 200 m.p.h. at the beginning of the tubes in a large locomotive working hard. But it seems as if the velocity below the arch is comparatively low, and that there is a zone of high turbulence and upward gas movement beginning suddenly below the end of the arch. One of the results of these velocities and turbulence is that with fine coal the unburned fuel loss is very high, whether the locomotive is hand- or stoker-fired, but observations through transparent inspection doors in the firebox walls have indicated very different behaviour of almost similar-sized lumps of coal in the fire-bed. Some were lifted and whirled away into the turbulence zone unburned; others close by fell back after being lifted 6 to 8 in.; and these actions eventually were traced

to the difference in the size of the air openings in the grate; large openings allowed the coal to be blown off altogether. In turn, this has led on certain railways to the use of air openings of restricted size, often—but not always—in conjunction with a reduced aggregate air space.

A Broken Steam-Brake Link

The section of the L.N.E.R. between Annfield Plain and South Pelaw has a long succession of down grades, many of them steep, and special brake regulations are in force in connection with the running of heavy mineral trains. These trains make a stop when running down at West Stanley for brake examination and readjustment. On April 20, 1942, a train failed to do so, and running on out of control was derailed at South Pelaw Junction, where the signalman had prudently set the route towards the Pontop branch. The driver and fireman were killed. Mr. J. L. M. Moore, whose report is summarised at page 235, found that the steam brake had been rendered useless by the fracture of a link at an eye, due to a flaw which could not have been detected by visual inspection. As no previous failure of this kind has occurred he sees no reason to object to the form of construction, which although theoretically inadvisable, is much used, by which the failure of the one part could make the whole brake inoperative. Modern practice, however, is to have separate engine and tender brake cylinders.

Comparing Locomotive Performances

Those who make a study of locomotive performance on the road are often desirous of making a direct comparison between the power output of locomotives of different railways, especially on runs on which the performance has been notable. When test runs have taken place, and indicator and dynamometer car records have been made public, comparison is, of course, simple enough; but comparison is not so easy when the enquirer has at his disposal only the times, speeds, train weight, and gradient inclination on any given run, and when, moreover, it is desired to compare runs over two different main lines with widely divergent characteristics. On p. 235 we publish a graph prepared by Mr. W. A. Tuplin, D.Sc., which, although necessarily approximate in the accuracy of its readings, facilitates the making of these comparisons. Based on the Davis formula for train resistance, this diagram assumes a gross average weight of 8 tons an axle throughout the train, and gives the horsepower exerted at the locomotive drawbar up gradients of varying inclination. An important qualification, of course, is that the locomotive shall have either accelerated up the gradient to the speed used for reading off the graph, or shall have settled down to a steady rate of travel up a reasonably long gradient; a speed which is still falling, or a minimum speed up a short gradient governed largely by the impetus with which the climb was begun, is useless for the purpose of calculation.

An Early Locomotive Test

Between 1860 and 1864 the Northern Railway of France conducted careful tests on the rate of heat absorption in different sections of the tubes and firebox of a locomotive boiler of small size. Boiler and firebox together were divided into five sections arranged for continuous gas flow but with separate water levels. The barrel contained 125 tubes of $1\frac{1}{2}$ in. dia. and 12 ft. 4 in. length; the grate was 3 ft. square and the steam pressure was only 80 lb. per sq. in. The evaporation reached a maximum of 7,950 lb. an hr., and at firing rates of 94 to 110 lb. per sq. ft. of grate an hr. the boiler efficiency was approximately 72 per cent. As to absorption efficiency, percentages of 80 were reached with both coal and coke fuels, and under certain conditions the firebox was responsible for 35 per cent. of the total heat absorption. When burning briquettes, the average evaporation from the firebox section was 35 lb. a sq. ft. of heating surface an hr., and of the four equal tube sections 10, $4\frac{1}{2}$, 3, and 2 lb. a sq. ft. an hr. respectively, but with equal draughts coke gave lower rates of evaporation. Tests using briquettes showed that with half the tubes plugged the evaporation attained 87 per cent. of that with all tubes free. The firebox heating surface was 77 sq. ft. and the volume only 33 cu. ft., and the test data indicated that a heat release of 354,000 b.t.u. a cu. ft. an hr. was reached in conjunction with a firebox heat absorption of 44,900 b.t.u. a sq. ft. of firebox heating surface. Under modern normal operating conditions the heat in the fuel fired per cu. ft. of firebox volume is probably about 250,000 b.t.u. an hr., although tests on one of the large locomotives of the Pennsylvania Railroad showed 650,000 b.t.u. a cu. ft. an hr.

Modernised 2-8-0s Make Good

WHEN a locomotive has been rebuilt in accordance with one or other of the terms by which the process is known, such as conversion, reconstruction, or modernisation, only a few of its original components usually remain; indeed, it is commonly asserted that the only really permanent features of the construction are the wheel centres. That, although an exaggeration in many cases, is not so wide of the mark in others, as rebuilding may take place more than once on the same engine. That it should be worth while speaks well for the original design; also for the materials used and the manufacturing methods followed. A noteworthy recent case among many that might be mentioned is that of the 2-8-0 locomotives built in 1907 by Beyer Peacock & Co. Ltd. for the Central Uruguay Railway. They have been modernised twice and now emerge as much improved machines capable of further years of superior service. The work has been carried out in accordance with a systemised and carefully thought out plan introduced a few years back by the Chief Mechanical Engineer of the railway concerned, Mr. P. C. Dewhurst. The engines were primarily delivered by the builders as non-superheated coal burners and subsequently, that is as the first modification, they were converted to oil burning and in spite of their "D" pattern valves had superheating apparatus fitted in addition to other equipment. This considerably improved the performance of the locomotives and proved generally efficacious but as time went on and the need for increased power output arose, Mr. Dewhurst subjected the engines to a second rebuild and a very excellent one at that. He modified the valve motion, fitted a new and larger boiler of his improved design incorporating a steel firebox with thermic syphon, and gave the locomotives new cylinders with large-diameter long-travel piston valves. The steam ports are of ample proportions with passages designed to reduce steam-pressure drop to a minimum and there are other improvements, details of which are given in the illustrated article on pp. 225-228 of this issue. Attention may be drawn to such features as the oil-burning apparatus and also to others connected with the superheating system including steam-circulating and anti-vacuum valves of which drawings appear on page 228. Mr. Dewhurst informs us that in service these rebuilt engines have shown results considerably better than expected and that the improvement in fuel consumption per ton-mile is even greater than the improved haulage capacity. He is to be congratulated on the result of his efforts.

Wartime Income Changes

THE personal incomes of individuals must surely rank among the properties which during the present war are being most rapidly transferred to the State. The House of Commons has recently given some details of the number of individuals paying income tax and surtax, the amount assessed to tax and the total tax assessed for the financial years 1938-39 and 1941-42. *The Economist* has made an analysis of these figures and has reached some interesting conclusions. The number of individual incomes reviewed for taxation shows an impressive increase between the two years; it rose from 9,800,000 to 15,000,000; the increase in the number of persons liable to pay tax was even more marked, for it rose from 3,800,000 to 10,500,000. Thus two out of every nine persons, including women and children, had to pay income tax last year. The reasons for the increase were first, the reduction in the exemption limit, and secondly, the remarkable increase as a result of the growth in the national income, in the number of incomes in the lower categories. As might be expected in prevailing conditions, the largest increase among the various groups has taken place in the lowest income categories. Thus the number of individual incomes between £125 and £250 rose from 7,250,000 to 9,200,000; those between £250 and £500 increased from 1,750,000 to 3,500,000; those between £500 and £1,000 increased from 500,000 to 685,000, and those between £1,000 and £2,000 advanced from 195,000 to 210,000. It is significant that here the increase stops suddenly. The number of incomes in excess of £2,000 a year in 1941 was exactly the same as in 1938-39.

The changes in the number of taxpayers and the size of individual income groups between 1938-39 and 1941-42 throws further light on the redistribution of the increased national income during the period. Practically all the increase has gone into the lower income layers. A little has percolated to the £1,000 to £2,000 income group; but nothing seems to have reached the higher levels. The redistribution of the national income, the reduction in the income tax exemption limit, and the increase in the rates of income tax and surtax, have profoundly affected the incidence of personal taxation. As would be expected in view of the already heavy burden of taxation on the higher income classes, the lower and middle income groups have been called upon to make a much greater contribution. This is because it has become impossible to increase the taxation of the rich; the highest incomes are already paying at the rate of 19s. 6d. in the £. In practice, it has become impossible for an individual to have a net income in excess of

£3,000 a year. The Chancellor of the Exchequer said on August 30 that if every penny of incomes above £2,000 were taken from those with incomes above that figure the Exchequer would get only about £30,000,000 more. A matter of considerable significance from the industrial point of view, is brought out of the analysis; this is that the total amount of non-personal income assessed for income tax—mainly company reserves—declined between 1938-39 and 1941-42 from £340,000,000 to £300,000,000. After allowing for taxation, the net amount suffered drastic curtailment from £250,000,000 to £155,000,000. The combined effect of Excess Profits Tax and the higher level of income tax has thus markedly diminished the capacity of industrial undertakings to accumulate reserves. This indeed is a feature of existing taxation which has aroused considerable foreboding as to the post-war era, and which the promise of a partial repayment of E.P.T. after the war goes but a small way to ameliorate. The following table, compiled from composite sources, reveals some curious movements in gross income:—

GROSS INCOMES (BEFORE TAX)

| Range of gross incomes | No. of incomes | | Aggregate gross incomes | | Average gross incomes | |
|------------------------|----------------|---------|-------------------------|---------|-----------------------|---------|
| | 1938-39 | 1941-42 | 1938-39 | 1941-42 | 1938-39 | 1941-42 |
| £125-£500 ... | 000's | 000's | £Mn. | £Mn. | £ | £ |
| £500-£1,000 ... | 9,000 | 12,700 | 1,850 | 2,815 | 206 | 222 |
| £1,000-£2,000 ... | 500 | 685 | 350 | 455 | 700 | 664 |
| Over £2,000 ... | 195 | 210 | 270 | 300 | 1,384 | 1,429 |
| | 105 | 105 | 530 | 530 | 5,048 | 5,048 |

In the £125 to £500, and £1,000 to £2,000 classes, the average gross income before direct taxation seems to have increased during the war. In the lowest class, it has presumably increased, and in the highest class it has remained stable. On the other hand, in the £500 to £1,000 a year class, it has declined, which would seem to suggest that there has been a migration just across the £500 line, or that a number of persons who were in this class have lost income as a result of the war. According to Sir Kingsley Wood, the total amount left after payment of tax in the incomes between £125 and £500 a year has actually increased since 1938 by no less than £700,000,000. Lastly, we append a table showing the percentage distribution of personal gross and net incomes over the two periods:—

| Range of gross incomes | Distribution of gross incomes | | Distribution of net incomes | |
|------------------------|-------------------------------|-----------|-----------------------------|-----------|
| | 1938-39 | 1941-42 | 1938-39 | 1941-42 |
| | Per cent. | Per cent. | Per cent. | Per cent. |
| Under £125 ... | 35½ | 33½ | 38 | 39 |
| £125-£500 ... | 39½ | 45½ | 42½ | 47½ |
| £500-£1,000 ... | 7½ | 7½ | 7½ | 6½ |
| £1,000-£2,000 ... | 5½ | 4½ | 5 | 3½ |
| Over £2,000 ... | 11½ | 8½ | 7½ | 3½ |
| | 100 | 100 | 100 | 100 |

The first pair of columns shows the effect of what may be called the economic changes of the war; the second pair shows the effect of the economic changes, together with that of taxation. It would appear that 79½ per cent. of the gross personal incomes of the community, and 86½ per cent. of its purchasing power (the net personal incomes after direct taxation), is now in the hands of those whose gross incomes are less than £500 a year. During the war, the middle classes (£500 to £2,000) have had their share in the national purchasing power reduced by one-fifth, the rich by one-half.

♦♦♦♦♦

American Wartime Passenger Services

AT length the effects of the war are beginning to be felt by passenger train services in the United States. Until mid-summer very few changes had been made, but the factor which is now likely to force the issue more violently than any other is the shortage of rubber, and the consequent restriction of private and public road services. The immediate policy of the railways as to passenger travel has been announced by Mr. John J. Pelley, President of the Association of American Railroads. They will no longer solicit travel by advertising or any other means, though announcements of train service changes and publicity concerning the essential part that is being played by the railways in winning the war will utilise the same advertising space as before. No special trains will be run for conventions, sporting events, or any other purposes not considered essential to the war effort. In order to increase to the maximum possible degree the accommodation of the trains, the use of purely "luxury" cars will be largely discontinued, all Pullman services will include (so far as locomotive power permits) "coaches" or third class

cars, and repair and reconditioning will be undertaken of all stock that is in a reasonably serviceable condition. In furtherance of the policy last-mentioned, the Pullman Car Company has already converted a number of old Pullman cars into modern chair-car equipment, to the order of various railways, and the Chicago & North Western RR. is now converting some of its parlour car stock into coaches. Other steps taken have been to eliminate the reservation by one traveller of a complete "section" in the widely-used convertible Pullman sleepers (which in effect puts the upper berth out of use), the insistence on payment in advance for all Pullman reservations and refusal to refund the supplementary charge unless cancellation is made in time to permit a re-letting of the space, and similar measures designed to secure that all accommodation will run filled to capacity.

In the matter of speed the American railways are taking a realistic view. They are fortunately free from almost all the bombing risks that have had to be taken into account in British railway wartime operation, and also, except in coastal areas, from the blackout conditions that so hamper our night working; better still, they are free as yet from any hampering Government control that fixes one inflexible maximum speed irrespective of the conditions which govern the running over different routes. On the other hand, it is realised that on the majority of the American long-distance journeys any severe slowing-down of the trains, so far from helping the railways to overcome their difficulties, would greatly intensify them; if, for example, a streamline express makes a journey of 1,000 miles in, say, 18 to 20 hr., and as a wartime measure the journey time were to be eliminated to over 24 hr., four sets of stock and motive power would be needed to maintain daily service instead of two. The alterations made in the schedules of the high speed streamliners—and up to the present these have been very few in number—have not been allowed more than slightly to reduce the lay-over time at each end of the journey. The trains affected include the City of Los Angeles, City of San Francisco, City of Portland, Super-Chief, and El Capitan, between Chicago and the Pacific coast, which have had their time increased from 39½ to 41½ hr., but as the distances covered range from 2,227 to 2,299 miles, the overall speeds are still as high as 53.4 to 55.1 m.p.h., including negotiation of the long and heavy grades through the Rockies. The Denver Zephyr and the City of Denver similarly are slowed from 16 to 17 hr. each way, and here the overall speeds remain 60.8 and 61.6 m.p.h. respectively.

On other routes new streamline trains quite recently have been put on at higher speeds than ever previously, in particular the Panama Limited of the Illinois Central RR. between Chicago and New Orleans, and the Colorado Eagle of the Missouri Pacific RR. between St. Louis and Denver. In both cases there has been an acceleration of 2 hr. over the fastest previous times, but simultaneously other express services over the same routes have been decelerated. For the present this seems likely to be a general policy. Those whose business requires haste will have at their disposal a limited number of services almost, if not quite as fast as in peacetime, chiefly maintained with diesel power, which operates most economically at its rated maximum output, and requires the least time for servicing at terminals; other trains are being slowed somewhat to permit of their being made up to the maximum weight that the locomotives will handle. The fact that the highest practicable speeds allow the maximum utilisation of stock, both passenger and freight, and at the same time reduce line occupation, is a very important factor in maintaining the *status quo* in American schedules for as long as possible. Thus the densely-occupied main lines of the New York Central and Pennsylvania Railroad in the Eastern States have as yet seen but little change in running times. The schedules of such famous trains as the Twentieth Century Limited, Broadway Limited, Pacemaker, Trail Blazer, Commodore Vanderbilt, and others between New York and Chicago remain as yet unaltered, and with many others the modest increases of 10 to 15 min. on journeys of nearly 1,000 miles are no more than sufficient to give increased time at intermediate stops and so to ensure punctuality, which in the United States is considered just as essential in war as in peace. The conclusion cannot be escaped that, as in the operation of their wartime freight traffic, which we discussed in an editorial in the August 7 issue of THE RAILWAY GAZETTE, American railways are providing better passenger service by their own individual action and co-operation than they would do under Government control.

SPECIAL TRAINS FOR HOP-PICKERS.—The hop-picking season has commenced, and as usual the Southern Railway is arranging to convey from London to Kent by special train about 50,000 pickers, many of whom always spend their yearly holiday in this manner. Close co-operation exists between the S.R. and the farmers; the latter decide the dates picking shall commence, and the company makes the necessary train arrangements.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

A Forgotten London Train Service

United University Club,
Pall Mall East, S.W.1. August 21

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Regarding my letter in your August 21 issue, I recently looked up the timetable of the Midland Railway service from St. Pancras to Mansion House sixty years ago. I made a note of the timing of one of the trains as a sample, and now enclose the note, as I think it may interest you. The trains stopped at all stations, but I have only inserted sufficient stations to show the route followed. St. Pancras dep. 1.10; Kentish Town 1.16; Finchley Road 1.23; Child's Hill 1.29; Dudding Hill 1.33; Acton 1.43; Turnham Green 1.49; Hammersmith 1.55; Earl's Court, arr. 2.1, dep. 2.6; Victoria 2.17; Charing Cross 2.23; Mansion House 2.29.

No one would wish to travel all the way from St. Pancras to Mansion House; but for intermediate distances, say from Kentish Town to Turnham Green or from Dudding Hill to St. James' Park, the trains would be very useful even today. You will remember that the Midland, the L. & N.W.R., and the L. & S.W.R. companies all had tank engines of the standard Metropolitan type.

Another London service which was valuable to north country passengers was that of the L. & N.W.R. from Willesden Junction to Waterloo and Willesden Junction to Victoria. I had to travel from time to time between Carlisle and Southampton, and the Willesden Junction—Waterloo trains were able to deal with heavy luggage, which the present tube connection between Euston and Waterloo cannot handle.

Yours faithfully,
W. B. THOMPSON

Locomotive Naming Ceremonies

14, Highfields Road,
Huddersfield, Yorks.

August 12

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—May I suggest that it is high time some attention was called to the time-wasting performance that seems to have established itself as part of the routine associated with the naming of the Southern Railway Pacific locomotives. The latest example of this appears in your issue of August 7, but I am pleased to note that this occasion was marked by certain features that distinguish it to at least a small degree from the stereotype accounts of previous occasions. A sense of urgency seems to have pervaded the atmosphere in that two locomotives instead of the usual one were named, and the number of eminent personages witnessing the event appears to remain at a fairly constant figure. Hence, the number of man-hours occupied at this stage of the production has been halved which seems to indicate a marked improvement.

At this stage one might reasonably inquire what must be the effect on war production of so many executives engaged on such a small matter. Among those present appear those whose positions would give but small indication that they could occupy valuable time on such a trivial matter, especially when it is realised that some have already attended similar ceremonies some half a dozen times previously, and must by this time have become quite hardened.

However, on this last occasion some remarks were passed that must have been of some interest to those whose memories serve them well. Colonel Eric Gore-Brown is reported as having said that locomotives were designed during the war and that they had been built originally to handle the overseas passenger traffic of Southampton. Few can have been aware that the passenger traffic at Southampton had recently developed on such extensive lines to warrant the building of such powerful locomotives. Of course, the fact of the matter is that the design was originated well before the war started, and that it was not until eighteen months afterwards that the first locomotive was finished, which does not appear to be such a great achievement as Colonel Eric Gore-Brown seems to think.

Lord Essendon was no less illuminating in his remarks when he reminded his hearers of a previous ceremony in which he, too, had participated. It will be recalled that on that occasion, not content with a naming ceremony, a whole trainload of guests was taken for a rail trip of some forty miles despite the imminence of a coal shortage. Hence it was fitting that Lord Essendon should refer to fuel on this occasion, although the point must have escaped those who realised that some coal must have been used to bring two locomotives some seventy miles from Eastleigh to Victoria Station to say nothing of the traffic difficulties associated with such a trip. He referred too, to his having piloted the engine on the previous

occasion whereas reports indicated that Lord Essendon travelled on the footplate which as most will realise is rather a different proposition. As the hint at economy had already been made it seems a pity that no mention was made of the fact that other railways are actually removing nameplates in an effort to economise, instead of burdening the locomotives with what must be the largest nameplates in this country.

It may be supposed, however, that as the programme of construction is well under way, there will shortly be appearing fresh reports of still further ceremonies attended by similar people until at long last the programme is completed. Let us therefore hope that we shall be refreshed by new attacks on advocates of standardisation (Mr. R. Holland-Martin, October 24, 1941) by the Chairman of the railway which set out to standardise as fast as it could after the railway amalgamation.

Yours faithfully,
R. HOWARD

[A proof of the above letter was sent to the Southern Railway and we have received the following reply from the company's Public Relations Officer.—Ed. R.G.]

Southern Railway,
General Manager's Office,
Waterloo Station, S.E.1 August 28

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I am interested in Mr. Howard's letter which criticises the naming ceremonies of the Southern Railway "Merchant Navy" Class engines which have lately been putting up such excellent records.

British modesty would doubtless lead many people to pass criticism on the same lines as Mr. Howard. I venture to think, however, that their reasoning is mistaken, and those who have the courage to carry on the traditions of this country during the war are showing the finest fighting spirit and confidence in their country, and the naming ceremonies of the "Merchant Navy" engines have become in wartime a National asset.

At a time when the Empire should be knit together in the closest possible way, it is very encouraging to find that no less than 44 Canadian papers printed photographs and stories of the naming ceremony of the "Canadian Pacific" engine. The effect on the number of Canadian troops in this country when they see this engine is a valuable asset.

The same can be said of the other "Merchant Navy" engines, which carry the house flags of great shipping lines that form the link between this country and so many of the Dominions and Colonies. The naming of this Class after the Merchant Navy is particularly apt in view of the position which the merchant Navy and its seamen occupy in the public mind at the present time.

Every machine has to be tested before it is put into regular service, and many engineers are reluctant to risk anyone but themselves seeing their products in the experimental stage. The Southern Railway had the courage to test these engines openly with passengers on board the trains.

Yours faithfully,
C. GRASEMANN
Public Relations & Advertising Officer

RAILWAY STAFF CASUALTIES IN AMERICA.—In the United States a close watch is kept on the casualty rate among railway employees; it is the subject of an annual competition between American railways, in which awards are made each year to the companies which are able to return the lowest casualty figures in proportion to the total man-hours worked by their staffs. Close analyses are made as to the causes of casualties, and in the constant search for safer methods of working, stress is laid on the relatively trivial causes of many accidents to personnel. For example, in permanent-way maintenance baggy or torn clothes can be an indirect cause of injury, especially to men working about power machines or tools. Loose or worn soles and heels of footwear may cause a man to slip or stumble at a moment when safety depends on surefootedness; failure to take nails out of a piece of timber, or to turn it upside down so that they are pointing to the ground, may result in blood-poisoning. Dull tools, loose handles, a dull point on a cant hook, wrenches with worn or loose jaws, oil or grease on striking tools or wrenches, insecurely fastened drills, chipping blades, or other loose parts of power tools, all add their quota to the causes of avoidable injury or even death. In the interests of sight preservation, more insistence is placed in America on the general use by workers of goggles than is the case in this country. Recently, in our American contemporary *Railway Engineering & Maintenance*, a general inspector of bridges gave it as his opinion that carelessness is the sole cause or the principal contributory to 90 per cent. of the personal injuries sustained by permanent-way maintenance men.

The Scrap Heap

"IS YOUR JOURNEY — ?"

Rumanian police have sent 235 people to concentration camps for travelling unnecessarily by train.—From the "Daily Express."

ROYAL TRAVEL ON THE G.W.R.

When King Edward and Queen Alexandra went to lay the foundation stone at Dartmouth Naval College on March 10, 1902, their command special took only 4 hr. 23 min. to complete the 228½-miles non-stop run from Paddington to Kingswear. After the ceremony the train took the royal party on to Plymouth, and returned on the following Monday. The up journey provided the first non-stop express run from Plymouth to Paddington, with a time of 4 hr. 44 min. for the 245½ miles. Engine No. 3374 was used in both directions; it was originally named *Baden Powell*, but was specially re-christened *Britannia* for the occasion. It was one of the 4-4-0 "Athara" class, with 6 ft. 8 in. coupled wheels. On this trip water was picked up from the new Crech water troughs.

Queen Alexandra was a delightful passenger, always gracious and considerate to the train staff, and ever grateful for the slightest service rendered her. She never finished a trip without personally thanking the driver of the train for his skilful work.

King Carlos of Portugal was another royal patron of the G.W.R. who revelled in his train journeys and always let his pleasure be plainly seen. He was a very merry monarch, and laughed and joked all the way.

In sharp contrast to these happy-mannered Royalties were two other European monarchs who accompanied the King and Queen on various journeys—stern, imperious Wilhelm II of Germany, and the

solemn-visaged Leopold II of Belgium, who never dropped his ceremonial air when travelling.

Among the papers to be retained by the House of Commons Library, which is conducting a salvage clearance, are manuscripts which describe the plans for building Southampton Docks, for making the first railway from London to Dover "to be called the South-eastern Railway" and for building Lambeth and Hungerford bridges across the Thames.

G.W.R. TO THE RESCUE

At the camp of the Berkshire Cadet Corps, which could obtain neither help nor a sufficiency of labour, the feeding of 500 boys with sharpened appetites came near to breaking down. The situation was saved by the help of an Area Catering Manager of the Great Western Railway.—From an article on *Army Cadets in Camp* in "The Times."

The L.N.E.R. has decided that in future the top hat shall not be worn by those stationmasters of whose attire it normally forms a part. Commenting on this, *The*



A "scrap heap" of broken railway crockery. Small wonder an appeal is being made to travellers to bring their own mugs, &c., for refreshments

Yorkshire Post says: "With its disappearance from the heads of these railway dignitaries, the top hat will almost cease to exist as an article of everyday wear. Bank messengers and bishops still use it; but even M.P.s. seem to have abandoned it in favour of the black Homburg."

It is understood, however, that the latter type of headgear will not be worn in place of the top hat, but that the L.N.E.R. prescribes the bowler as suitable wear for stationmasters.

That well-meaning person, Billy Brown, has now appeared in a new place. Absent-mindedly turning over my bus ticket yesterday, I read on the back:

Billy Brown's had a rise
In busmen's estimation
Since he paid the fare exact
And named his destination.

I expect to see Billy Brown on posters. But I must confess that his new method of approach gave me the same sort of shock as when a club member whom you have known by sight for years suddenly speaks to you.

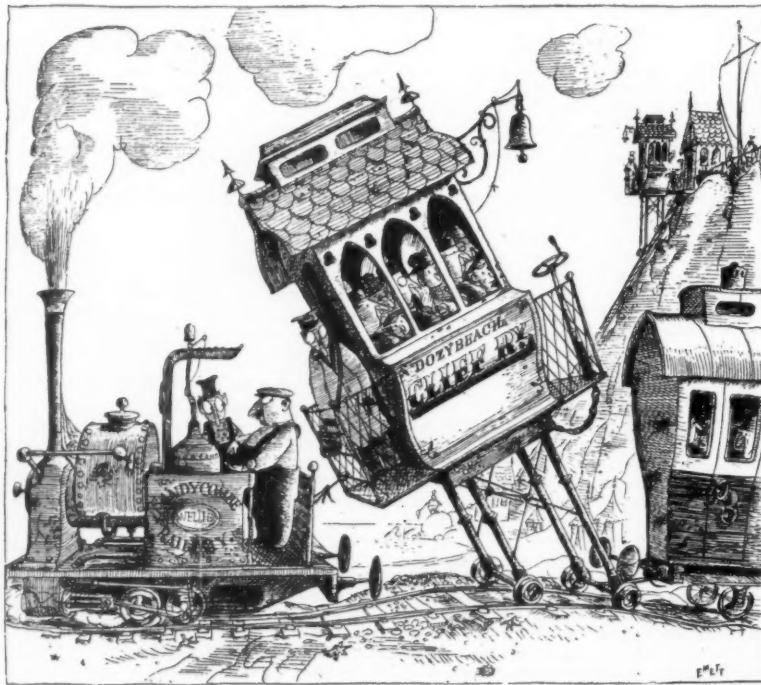
My remarks about Billy Brown yesterday have inspired the following:—

I'm sick to death of Billy Brown
And all his quips in London Town.
O Transport Board, please rallentando
And send him on the next Commando.

But will the L.P.T.B. de-reserve him?—
"Peterborough" on successive days in "The Daily Telegraph."

Announcing Mr. V. M. Barrington-Ward's new appointment, *The Yorkshire Post* points out that he comes of a gifted family, of which it gives the following description: "Mr. Barrington-Ward is a member of a distinguished family. One of his brothers, Mr. R. M. Barrington-Ward, is editor of *The Times* and has given the leaders of that newspaper a new vigour; another brother is Sir Lancelot Barrington-Ward, the eminent surgeon; another is Classical Tutor at Christ Church, Oxford; and a fourth, the late Mr. F. T. Barrington-Ward, K.C., was a Metropolitan magistrate."

Two boys remanded recently at Liverpool were said to have told a railway policeman, who found them looking very dirty and dishevelled early this morning, that they had ridden on train buffers all the way from London. They were said to have run away from a remand home.



"... and then they brings out this Pooling of Rolling Stock business"

[Reproduced by permission of the proprietors of "Punch"]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

CANADA

Coaches as Temporary Station

Sudbury, Ontario, on the Canadian Pacific Railway, has increased in population from 16,000 to 37,000 in the past 15 years, and, in consequence, station improvements recently have been carried out; the remodelled buildings were to have been brought into use on August 1. To enable the engineers to have uninterrupted use of the buildings during reconstruction, it was decided to carry on station work and to provide all ordinary conveniences by stabling a train of four special coaches nearby, and by using it as a temporary "station building." The first coach was fitted up as a women's waiting and rest room, the second as a booking office and stationmaster's office, the third as a men's rest room and waiting room, and the fourth as a refreshment room. In the booking office there were separate ticket windows opening into the two waiting rooms. Each coach has a telephone; and a lunch counter runs the length of the restaurant car, in which 55 passengers can be served at a time.

UNITED STATES

Cabooses without Cupolas

A new type of caboose, or brake van for freight trains, is under construction by the Missouri Pacific Railroad, the chief feature of which is that the glazed cupola or bird-cage above the main roof—a characteristic feature of all American brakes, and provided in order to give the brakemen a clear look-out ahead above the roofs of box-cars—is abandoned in favour of a projecting "bay window" in each side of the van, similar to those so largely used in British passenger stock. The new cabooses, designed for branch-line work, are being rebuilt from 36-ton 40-ft. steel box-cars, with an overall width of 9 ft. 3 in., which is being increased to 10 ft. 11 in. at the bay windows. In view of the internal space available, a forward compartment 21 ft. long is being adapted to handle miscellaneous merchandise, which the crew will be able to sort *en route*, thereby saving time at the stations; the rear 15 ft. will be equipped for the crew with the now-customary stove, washstand, ice-box, seats, cupboards, and so on.

Slowing the Streamliners

The first of the American streamline trains to be affected by the present general easing-out of schedules, to meet war operating conditions, are those running west of Chicago. The City of Los Angeles, City of San Francisco and City of Portland (joint Chicago & North Western and Union Pacific Railroads; and also Southern Pacific in the case of the City of San Francisco) had their through runs lengthened from 39½ to 41½ hr., with effect from June 20. As the distances are 2,260, 2,299, and 2,272 miles respectively, the overall speeds are still from 54.1 to 55.1 m.p.h. From July 7 the Super-Chief and El Capitan of the Atchison, Topeka & Santa Fe, which ran the 2,227 miles between Chicago and Los Angeles in 39½ hr., were similarly slowed to 41½ hr. On June 28 the fast Denver Zephyr streamliner of the Chicago, Burlington & Quincy, and the City of Denver of the Chicago & North Western and Union Pacific, were decelerated from 16 hr. to 17 hr., so that the overall speed of the former now is 60.8 m.p.h. for 1,034

miles, and that of the latter is 61.6 m.p.h. for 1,048 miles, including stops in each case. Various minor changes are made on the Burlington and other systems, particularly between Omaha and Kansas City. On July 5 the Prospector streamliner, recently introduced by the Denver & Rio Grande Western, between Denver and Salt Lake City, was transferred to another duty, and, to maintain certain through connections, the Exposition Flyer, joint Burlington, D. & R.G.W., and Western Pacific train between Chicago and San Francisco via Denver and the Moffat Tunnel route, was altered to lay over 7 hr. 25 min. daily at Denver, making, in effect, two independent trains between Chicago and Denver, and Denver and San Francisco.

A Fine Punctuality Record

During the month of May the Southern Kansas and Northern Kansas divisions of the Missouri Pacific Railroad both achieved perfect passenger-train punctuality records, the former with 186 trains and the latter with 62. The routes concerned carry only a very light traffic and this represents an average of but 6 and 2 trains respectively each day, but even so the feat was notable. The White River Division came next with 99.2 per cent. of punctual arrivals, and the Joplin, Central Kansas, and Memphis Divisions all reported over 94 per cent. punctuality. As to fast freight operation, the White River and Northern Kansas Divisions both had a 100 per cent. score (the latter thus achieved 100 per cent. with passenger and freight trains alike), and the runners-up were Joplin Division with 96.9 per cent., and Southern Kansas Division with 96.6 per cent., of punctual arrivals.

New York Central Decelerations

The first eased-out train times in the Eastern States are announced by the New York Central System, effective from June 7. At present the crack trains, such as the Twentieth Century Limited, Pacemaker, Commodore Vanderbilt, Cleveland Limited, North Shore Limited, and Detrolter, are unaffected, although their timings may be modified at a later date. The eastbound Knickerbocker, leaving St. Louis at 12 noon, is now due in New York at 12.20 p.m., instead of 10 a.m., the next day, a journey (allowing for the change of time) of 23 hr. 20 min. for the 1,157 miles; the west-bound train, however, is only slowed by 20 min., to 21 hr. 40 min. The changes in times relate chiefly to eastbound trains; the Forest City, Lake Shore Limited, Water Level Limited, Wolverine, and Empire State Express all have had their journeys lengthened by 10 to 20 min. Details are not yet to hand of any corresponding modifications in the Pennsylvania Railroad timetables.

Service Charges on Limited Trains

To encourage more intensive use of the Twentieth Century Limited and Broadway Limited streamliners between New York and Chicago, the New York Central and Pennsylvania Companies have reduced the service charge for the use of these trains over the through journey from \$7.50 to \$5.00. For many years, when additional levies of this description were exacted for the use of certain famous trains in the U.S.A., this surcharge stood at \$10.00, but the majority of other similar supplements are disappearing, and the Twentieth Century and Broadway service charges are being gradually reduced. Both trains are

composed exclusively of Pullman sleeping, dining, and lounge accommodation, and their 16-hr. schedules (for a run of 958 miles on the N.Y.C., and 903 miles on the shorter but more heavily graded P.R.R. route) give an advantage of 1 hr. in time over the fastest of the other expresses on the service.

SPAIN

Freight Control

The control of car loadings and routing, under the supervision of the Delegacion del Gobierno para la Ordenacion del Transporte (Government Delegation for the Regulation of Transport) constituted under the Decree of March 31, 1941, has been successful in eliminating much of the delay and confusion previously existing in railway transport, according to the first report of the Delegate, Sr. J. M. de Peñaranda, for the half year May-October, 1941, published in *Ferrocarriles y Tranvías*. All requests for wagon space now go to the delegation, when priority is fixed and it is decided whether the traffic shall go by rail, road, or waterway. The Government Departments, railway administration, and other interests are represented on the delegation, and the system is so devised that a minimum of delay occurs in the ordering of transport. The number of car loadings increased during the half year from 150,000 in March, to 212,000 in October. The delegation is also charged with the distribution of tyres of road vehicles.

SWITZERLAND

Swiss Railway Mergers

As recorded in THE RAILWAY GAZETTE of February 20, the Rhaetian Railway has been enlarged since January 1, 1942, by its merger with the Chur-Arosa and Bellinzona-Mesocco Railways to a metre-gauge system 337 km. (209 miles) in length, although the latter line has no physical connection with the other two, as it is on the Tessin side of the Alps and, in fact, runs for a short distance in the Canton of Tessin. A portion of the Bellinzona-Mesocco rolling-stock already has been re-lettered "Rhätische Bahn—Ferrovia Retica," but its distinctive dark and light green colour-scheme has been retained. The Canton of Grisons has only 20 km. of standard-gauge line (part of the Federal Railways main line from the Zurich and Buchs directions to Chur, where it terminates. It has, however, a network of metre-gauge lines, chief of which is the Rhaetian Railway, which the Canton controls. The Federal Law of April 6, 1939, which came into force on November 11, 1939, provided for Government assistance to private railways considered to be of general economic or strategic importance, provided the cantons concerned contributed the same amounts, and a sum of fr. 125,000,000 was allotted for this purpose; it was stipulated that, where advisable, a merger of weak lines should be effected. The metre-gauge systems in the Canton of Grisons fulfilling these requirements were the first to be merged, but it is expected that others will follow, for example, the small private railways in the Bernese Jura and Chaux-de-Fonds districts, which will have to merge before their contemplated electrification can be carried out. The lines concerned in this case are the Saignelégier-Glovelier and Porrentruy-Bonfol (standard gauge), and Saignelégier-La Chaux-de-Fonds District (metre gauge), Railways. An editorial note on the subject of Swiss railway amalgamations appeared in THE RAILWAY GAZETTE of March 6.

Underpinning and Strengthening Track

Methods of treatment in India, where subsoil and formation had previously caused continuous trouble

ON certain long sections of the Great Indian Peninsula Bombay-Nagpur main line—traversed by the Bombay-Calcutta B.N.R. route mail trains—there is a black cotton subsoil and in places a treacherous formation where soft spots are so frequent as to render considerable lengths of line defective. The extremely flat terrain makes adequate drainage most difficult, and this particular soil loses its powers of load-bearing when impregnated with water, as happens during the short but heavy bursts of rainfall during the monsoon. On November 25 last, Mr. A. V. D'Costa, B.Sc., B.E., Associate Fellow of the Permanent Way Institution, read a paper to the Bombay & Western India section of that institution entitled "Experiments in Underpinning & Strengthening of Track on Unstable Formation—G.I.P.R., India," which dealt very fully with these defects and gives different methods employed to remedy them.

He explained that the cuttings, though shallow, are on the level or negligible gradients, and act as collecting channels for surface as well as sub-surface drainage. Original construction was faulty in that the borrow pits from which soil was used for banks were too near the toe of the slope, which caused saturation of the toe of the bank; the grading also was defective, as no attention was paid to drainage in cuttings.

In dry weather black cotton soil shrinks, splits, and cracks, throwing the track out of line and level, and causing uneven upheavals in the cold weather. During the rains, however, it becomes extremely spongy, with resultant sags and slides, which occur without warning.

Defective Track and Semi-Liquid Soil

To make matters worse, the former light 69-lb. rails on pot sleepers had to be relaid during the most acute period of the world slump, and so only second hand 82-lb. rails, also on pots, could be spared for the purpose. This track is badly worn, the writer says, and, with the increased axle-loading allowed over the heavier rail, has made greater maintenance difficulties. It is believed that some of the "hunting" troubles with the "XA" or light Pacific locomotives, and even derailments, occurred on this section of line, and from Mr. D'Costa's description of the formation and track, this, if correct, is hardly surprising. The already distorted rails have, it seems, become worse by hammer-blow action at the joints supported only by such a treacherous formation.

After one such derailment the Government Inspector recommended a further relaying with 90-lb. track on a heavier section of ballast, but it was not considered that this relaying was financially justified. Moreover, it was doubtful if the heavier rail, even with closer sleeper spacing and extra ballast, would reduce the track pressure on the road bed sufficiently for the black cotton soil to support it adequately when in a semi-fluid condition. In fact, this soil in a slushy state can withstand no bearing pressure when subjected to repeated rolling of traffic, as under these conditions no elastic dumping or pad of ballast can be retained under each sleeper, and the interstices in the ballast become filled with mud due to the semi-liquid soil squirting upwards under the pumping action of the rise and fall of the sleeper.

Though subsidence has been met by

ballasting and lifting of the track from time to time, the bank has either become broader, or, due to its better drainage, has sunk *en masse* into the sub-soil. High cesses and narrow ballast shoulders have resulted, and though drainage has improved to some extent, it was decided to try a variety of methods of underpinning the track to give greater sub-ballast support.

These methods consisted of:—

(1) The laying of a wooden sleeper mattress over a length of half-a-mile covered with a 12-in. layer of ashes on which the ballast and track were laid or lifted; drainage was improved by the 12-in. lift of the track.

(2) Half-a-mile of line was relaid with new 90-lb. track on trough sleepers with a maximum spacing of 2 ft. 6 in. and with a minimum depth of ballast under the sleepers of 12 in.

(3) Another half-mile length was also relaid with 90-lb. material with the same sleeper-spacing and ballast, but with C.S.T. 9 plate sleepers and the latest type Duplex joint sleepers.

(4) A 250-ft. length was provided with a reinforced concrete mattress under the existing track, and

(5) A similar length of the track had a corrugated-iron carpet laid under it; the sheets were 10 ft. long and of 20 b.w.g. There was a 4-in. layer of sand spread over the corrugated sheets.

At the site where method (1) was tried, a long sag in the track level had developed, with a maximum drop of 3 ft. below the original grading level, and, at its lowest point, the formation was just below natural ground level. The 3-ft. original bank had evidently sunk completely into the ground and at this point there is no drainage of the land or surface flow; rain water lay stagnant, sometimes over the track. Whole rail-lengths sank without warning and constant attention was required.

One Successful Method

As the ground was so flat, and as 82-lb. rails were available from the other two half-mile lengths which were relaid with 90-lb. material, it was decided to lay a diversion alongside the length to be under-pinned with the sleeper mattress. The original track was then dismantled, a layer of ashes spread to a camber, and on them the sleepers were spread in herring-bone pattern before being covered with the 12-in. upper layer of ashes. The old ballast was screened and new added, and the best (picked) track was finally laid. Though the first monsoon after underpinning produced a rainfall 50 per cent. in excess of normal, this length gave practically no trouble and has never required any abnormal attention since. The cost of this job worked out at about 3s. 9d.* a running foot, and maintenance costs have been reduced to less than half, to say nothing of the additional safety secured.

Where the second method was tried risk of sudden track sinkage appears to have been eliminated, but over-all settlement is occurring and lifting has been necessary. On the whole, however, maintenance is now easier and less costly.

The site selected for test (3) was one of the worst of all. Difficulty has been experienced with this special type of track due to the H joint plates sinking. The stiff rail joints rise up after the load has passed, but not the joint plates under them, with the result that subsequent loading causes a

* Excluding regrading done by maintenance gangs

hammer blow on the plates driving them down further. Undue stress is thus caused in the adjacent C.S.T. 9 sleepers. An estimated return of about 1.1 per cent. has, however, been secured on the outlay incurred in relaying in this instance.

R.C. Mattress Secures a Stable Track

In method (4) the r.c. slabs were cast near by, cured for a fortnight, and then carried horizontally by a 5-ton steam crane to site. There, by using cut rails, gaps were made in the track for the slabs to be inserted serially. The largest number of slabs put in in one 7-hr. day, in two line-blocks, was 12. It is estimated that this underpinning method has provided a return upon outlay of 10 per cent. The results far exceeded expectation, and a danger spot has been converted into a most stable length of track. The outlay was high—about 18s. a foot run—but it is considered money well spent.

An Unorthodox Method

The fifth and last method was tried in a shallow cutting the sub-soil of which was, for once, well drained. Nevertheless, water-logging and the formation of water pockets occurred, but this was purely from rain and not from sub-soil flooding. The use of corrugated iron for under-pinning was previously ridiculed in some quarters, but has belied all doubts and proved a definite success. The sheets were inserted between traffic blocks by breaking the track for a few rail-lengths at a time. It was found necessary to lay a bedding of moorum on the foundation, as a cushion for the sheets, and with a slight camber, namely 3 in. The corrugations settled well into the moorum and a one-corrugation overlap was allowed. At first traffic caused erratic transverse displacement of the track, sometimes in one and next day in the opposite direction. Equilibrium was, however, gradually restored and speeds raised, though each increase in speed caused this lateral movement for a time. There was no downward or upheaval movement at any time, and, except for this initial trouble, the test has proved very successful. The cost was about 6s. 5d. a running foot, and has secured a return of about 8½ per cent. on outlay.

Admittedly, all these results are from short-period trials and only prolonged test can give accurate results, especially as the life of the sleepers embedded in ashes and of the corrugated sheets in moorum and sand is an unknown quantity.

BRAZILIAN RAILWAY IMPROVEMENTS.—President Vargas of Brazil, on August 25, approved a contract amounting to \$14,000,000 for the reconstruction and improvement of the railway linking the Itabira ironmines in the State of Minas Geraes with the iron port of Victoria, some 270 miles north of Rio de Janeiro, reports Reuters.

NEW SOUTH WALES RAILWAYS.—The Commissioner reports that for the quarter ended March 31, 1942, the receipts of the New South Wales Government Railways were £6,791,721, against £5,496,351 for the corresponding period of 1941. The total for this year included passenger receipts of £3,017,207, goods receipts of £3,456,285, and £318,229 for the sale of electrical energy. The expenditure amounted to £5,084,164, an increase of £1,211,361, or 74.86 per cent., of the receipts. The number of passengers carried was 54,083,845, an advance of 5,793,808, and goods traffic increased from 4,399,816 tons to 3,982,715 tons.

Recent Locomotive Rebuilding on the Central Uruguay Railway

Engines of the 2-8-0 type originally built in 1907 have been modernised and improved in several important respects

RENOVATION of locomotive power by means of reconstruction, rebuilding, and other modernisation—so necessary in times like the present when new locomotives are almost impossible to obtain—was commenced a few years ago by Mr. P. C. Dewhurst, M.Inst.C.E., Chief Mechanical Engineer of the Central Uruguay Railway, and has recently been carried a stage further by the rebuilding of a number of 2-8-0 type locomotives originally constructed by Beyer, Peacock & Co. Ltd. in 1907. The diagram, Fig. 1, shows the engine as originally constructed for coal burning in copper fireboxes; superheating was, of course, absent and the valves were of the "D" pattern, placed above the cylinders and operated by Walschaerts valve-gear. They had been equipped subsequently to burn fuel-oil and supplied with steel fireboxes and—withstanding their "D" pattern valves—they had been superheated; amongst other changes, they were more recently fitted with top-feed injector deliveries, electric head-lights, and other equipment, and in this condition they are illustrated at the top of the next page.

In the present rebuilding they have been supplied with larger boilers—identical with those applied to some engines converted from 2-6-0 to 2-8-0 type which were fully described in the technical press during 1939. These have round-topped fireboxes, the inner firebox is of steel with the firebox-crown curved and supported by radial stays, and also other characteristic features of boilers of Mr. Dewhurst's design, including a thermic syphon in the firebox. Larger cylinders, with piston-valves of ample diameter, adequate steam and exhaust passages, and new valve motion arranged to provide a long valve-travel have been provided. One of the engines as thus rebuilt is also illustrated on the next page and Fig. 2 and Fig. 3 give the longitudinal and cross section views respectively and show their general constructional

features. The principal dimensions and ratios of the original and rebuilt engines are as follow:—

| | Original | Reconstructed |
|---|------------------|--------------------|
| Gauge | 4 ft. 8½ in. | 4 ft. 8½ in. |
| Curves minimum radius | 480 ft. | 480 ft. |
| Ruling gradient | 1 in 70 | 1 in 70 |
| Rails, weight per yard | 65 lb. | 65 lb. |
| Principal dimensions | | |
| Cylinders, two | 19 in. by 24 in. | 19½ in. by 24 in. |
| Type of valves | Flat | Piston 10 in. dia. |
| Dia. of pony wheels | 2 ft. 9½ in. | 2 ft. 9½ in. |
| Dia. of coupled wheels | 4 ft. 6 in. | 4 ft. 6 in. |
| Firebox, shell width | 4 ft. 1 in. | 4 ft. 1 in. |
| Grate length | 7 ft. 1½ in. | 7 ft. 0½ in. |
| Grate width | 3 ft. 6½ in. | 3 ft. 5 in. |
| Flues, number and outside dia. | 21—5 in. | 24—5 in. |
| Tubes, number and outside dia. | 134—1½ in. | 139—1½ in. |
| Superheater tubes, number and outside dia. | 84—1½ in. | 96—1½ in. |
| Heating surface | | |
| Tubes and flues | 1,191 sq. ft. | 1,278 sq. ft. |
| Firebox | 124 sq. ft. | 126 sq. ft. |
| Thermic syphon | — | 22 sq. ft. |
| Total evaporative | 1,315 sq. ft. | 1,426 sq. ft. |
| Superheater surface | 288 sq. ft. | 330 sq. ft. |
| Grate area | 25 sq. ft. | 24 sq. ft. |
| Boiler pressure, per sq. in. | 160 lb. | 180 lb. |
| Tractive force | | |
| At 85 per cent. boiler pressure | 21,820 lb. | 25,196 lb. |
| At 75 per cent. boiler pressure | 19,252 lb. | 22,230 lb. |
| Tractive force (at 85 per cent.) per ton of engine weight | 413 lb. | 427 lb. |
| Ratios | | |
| Adhesion weight | 4.55 | 4.4 |
| Tractive force (at 85 per cent. B.P.) | | |
| Total evaporative surface | 52.5 | 59.5 |
| Grate area | 25 sq. ft. | 24 sq. ft. |
| Total evaporative surface | 4.55 | 4.32 |
| Superheating surface | | |

The cylinders, piston valves, and the arrangement of the Walschaerts valve-gear are shown in Fig. 4. The steam ports are of ample proportions with passages designed to reduce steam-pressure drop to a minimum; the piston valves, of the narrow-ring

pattern, have the generous diameter of 10 in. for 19½ in. cylinders, and a maximum valve-travel of 6½ in. The design of the new-pattern cylinders is so arranged that similar cylinders can be applied subsequently to later engines of the same class already having piston-valves but of early design and with short stroke valve-gear so that similar boilers and cylinders can bring the later engines into line with the present modernised group when new boilers become necessary. The valve motion, as will be seen, is of straightforward current modern pattern having the combination-lever carried in guides concentric with the steam-chest covers.

The slide-bar carrier and brackets also reversing link and other brackets are all of plate construction fabricated by electric welding, as is also the reversing-shaft, this being built up with the arms, which are formed with large ring-ends, electrically welded to the shaft with a welding-run on each side completely around the shaft. All modifications to the main frames of the engines were also carried out by means of electric welding. The rebuilt engines have been equipped with screw reversing gear, and this is carried upon a bracket connected to the main frames and particularly designed to give minimum wear; the balancing of the motion is provided by a coil spring actuating an arm upon the reversing shaft. This spring is adjustable so that the initial compression provides an exact balance of the radius-rods and parts and the reversing-wheel operation is thus extremely light. Lubrication is arranged on the "non-driver's-intervention" principle, a mechanical lubricator on the right-hand side worked from the quadrant link supplying the steamchests, cylinders, and the piston tail-rod gland-guides, and one driven from the left side crosshead feeds the axleboxes of the coupled wheels; the pony-truck and tender axleboxes are lubricated from the under-side by elastic packing, and the big-end and coupling-rod bearings are grease lubricated.

The general features of the boiler will be seen in Fig. 2 and Fig. 3 and it will be noted that the firebox has a curved and slanting roof with ample vertical taper in the water-legs; the smokebox is of circular-extension pattern with a detachable front and relatively small door; there is a low blast-pipe

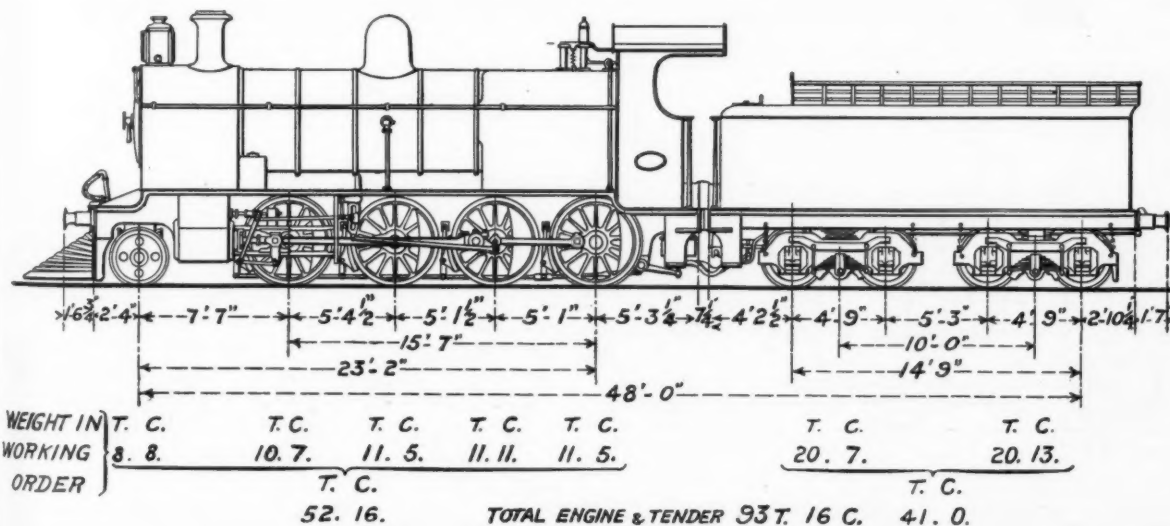
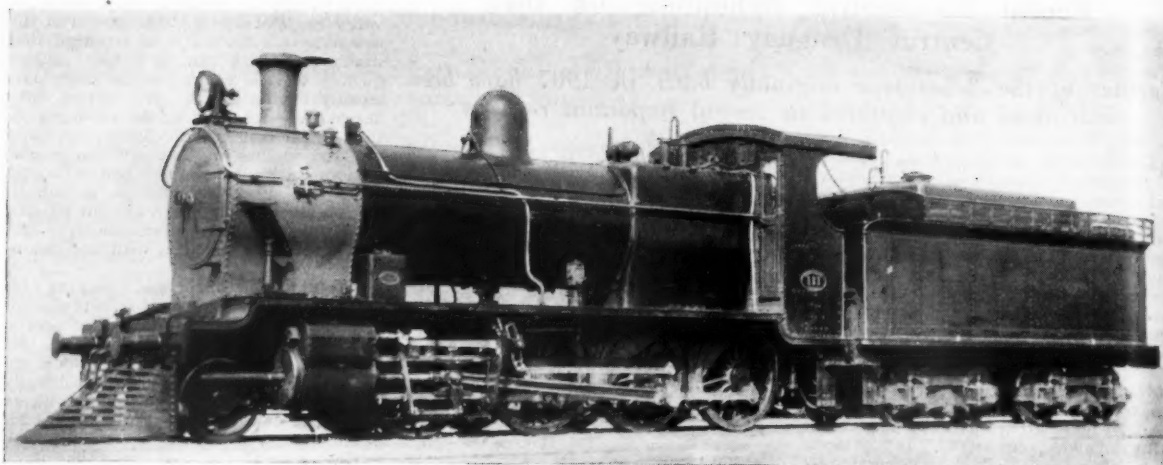
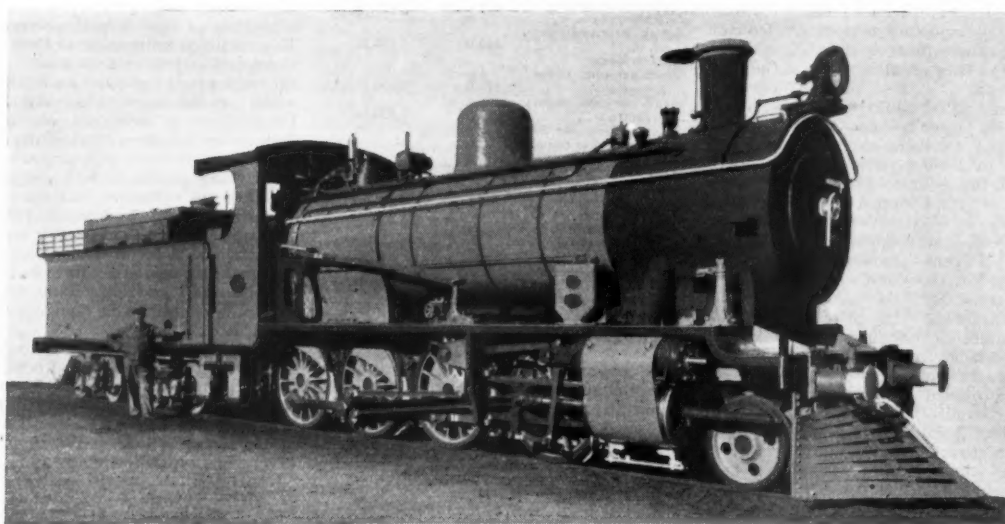


Fig. 1—Locomotive as originally built for coal-burning in 1907 by Beyer, Peacock & Co. Ltd.



Locomotive as first modified and converted from coal to oil-burning



One of the engines after final rebuilding

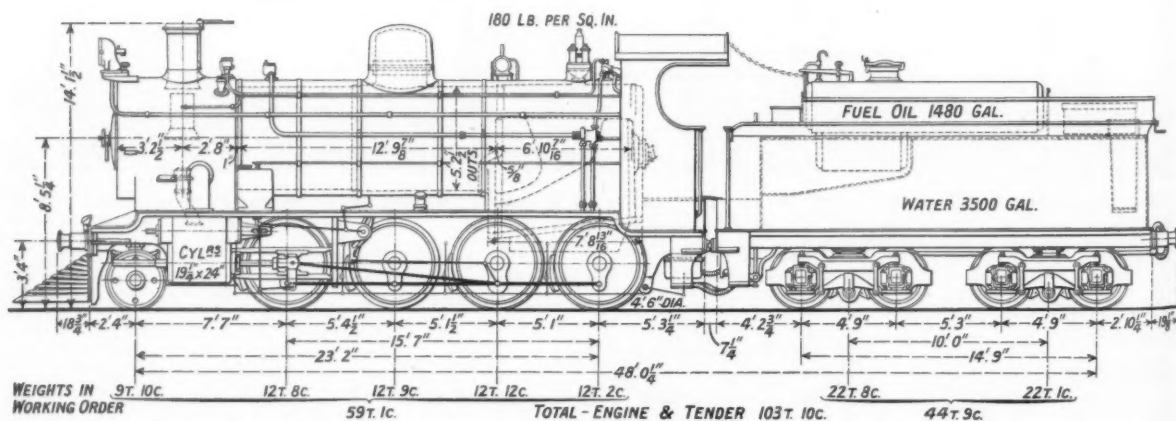


Fig. 2—Drawing showing overall dimensions and distributed weights of locomotive as now arranged

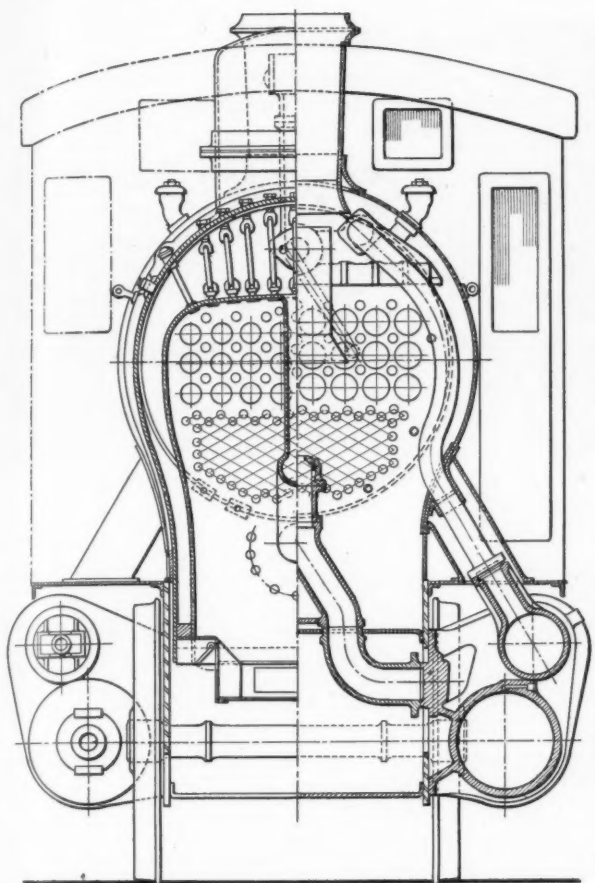


Fig. 3—Part sectional drawing showing (left) firebox, and (right) cylinder, steamchest, and piping

provided with a "jumper"—the orifice has four "nibs"—and a non-continuous petticoat. The safety valves are of the "pop" type placed at a good height above the water-level and there are not only washout and inspection holes at the haunches of the firebox, but also upon the boiler-barrel a short distance in front of the firebox tube-

unit joints, and, in accordance with the standard practice developed by the C.U.R. in recent years, the anti-vacuum—or "snifting"—valves are located upon the superheated side of the header, and Fig. 5 is a diagrammatic representation of the system. The steam circulating-valve comprises a small cylinder and piston with tail-rod, and

plate and to the rear of the smokebox tube-plate.

The oil-fuel equipment comprises air inlets at the burner, along the sides of the fire-pan, and at the fire-hole door, the combined area in the engines under notice being 48 per cent. of the total gas-area through the tubes. A preliminary heating of the fuel-oil takes place in the storage tank upon the tender and additionally during the passage of the fuel through an annular heater adjacent to the firepan on its way to the burner. The burner is of the customary "flat" pattern and the usual facilities for blowing through the burner to clear obstructions and blowing back into the oil tank, the special supply for lighting-up purposes, as also for the blower, oil heaters, and atomizer are provided; the valves for operating all these are assembled together upon a manifold placed conveniently for the fireman in the cab. The super-heater is of the short-bolt pattern with metal-to-metal

the half-section view shows the connection of the snifting valve to the header; these snifting valves being of the orthodox type but guided upon a downward prolongation from the cap and not by means of wings below the valve-seat. When the engine is in steam and standing, a supply of steam at boiler-pressure constantly acts on the tail-rod of the circulating-valve piston causing the latter to rise and uncover a port which permits a limited amount of steam to pass through the superheater elements down to the cylinders and in part to the atmosphere by way of the then-open snifting valves and also by vents in the steam circulating-valve body itself. The accumulation of excess pressure which might close the snifting valves and build up in the cylinders is provided against by a steam passage leading from the superheater side of the header to the top side of the circulating-valve piston upon which it would act and thus cut the steam port to the superheater elements.

Under running conditions with regulator open, steam from the superheated side of the header causes the circulating-valve to remain tight on its seating and at the same time shuts off the snifting valves. When drifting with the regulator entirely closed the snifting valves open automatically, pressure is released on the top of the circulating-valve, and steam pressure which is supplied by a pipe-line from the steam-turret to the under side of the circulating-valve tail-rod, causes the valve to rise and allow steam to circulate through the elements to the cylinders and finally to exhaust.

The system thus provides that when the engine is standing, steam circulation is maintained through the superheater elements, and when the engine is drifting with the regulator closed the major portion of the air passing through the cylinders is relatively cool; it is combined with the steam, passing through the superheater units which has subsequently been cooled in combination with the air entering by the snifting valves. This method of providing for standing and drifting has been found during some years' experience to obviate the troubles otherwise encountered on lines with frequently fluctuating gradients, due to excessive carbon deposits in the steam and exhaust passages.

The engine brakes are of the customary form and are vacuum-applied both on engine and tender, and there are four

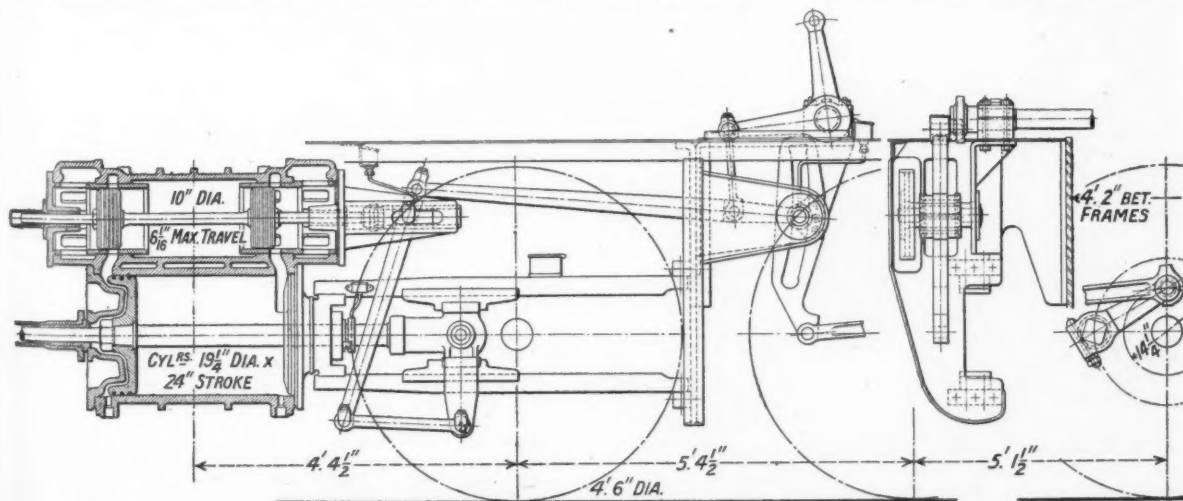
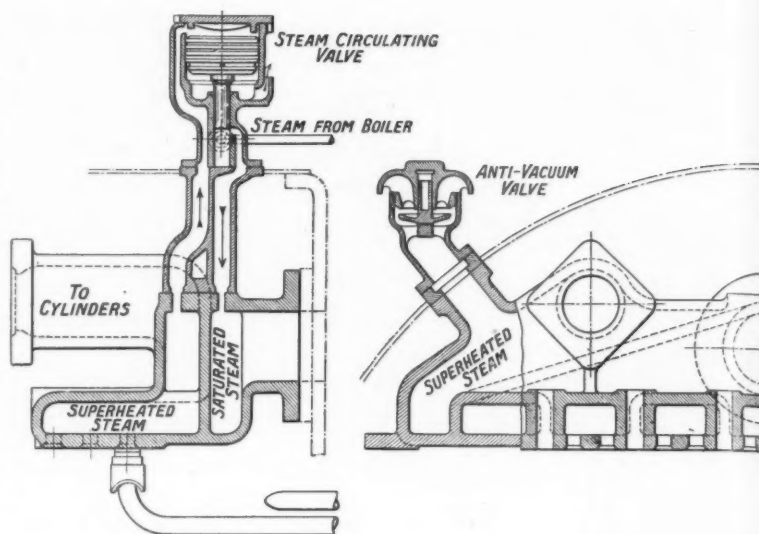


Fig. 4—Layout of cylinder and steamchest, and Walschaerts valve motion

sandboxes provided for forward running; all are operated, in pairs, by hand gear. The railway's usual standards of exceptionally strong cow-catchers, tip-up buffers, and special vacuum-brake hose-pipe connections at front, all with the object of dealing with cattle on the line with the least risk to the engine, are included.

In service these rebuilt engines have shown improved results considerably greater than the increase of dimensions before and after rebuilding would have suggested, and this is attributed to the extra advantage of improved boiler efficiency obtained per nominal unit of heating-surface, etc., and the better utilisation of steam by the improved design of valves and valve-gear; the improvement in consumption of fuel per ton-mile is consequently even greater than the improved haulage capacity.

Fig. 5—Sectional views showing details of the anti-vacuum or snifting valves located on the superheated side of the header



Welding Research Council's Work

THE Fifth Progress Report* of the Welding Research Council covers five years of welding research to March 31, 1942. It is published by the Welding Research Council, which has been set up as a result of the symposium on the welding of iron and steel held in London in 1935. A considerable number of industrial firms have been contributing to the £35,000 income of the funds, of which about £13,000 was contributed by the Department for Scientific & Industrial Research. The expenditure during the five years' period was in the neighbourhood of £24,000, of which £10,000 was direct research expenditure, but it is estimated that about twice or three times this figure would be the value of the work contributed without charge by industrial firms, university laboratories, and individual scientists.

Welding is being employed on an ever-increasing scale by the metal working industries and the railway companies are among the largest consumers of welded products. To those concerned with railway engineering and maintenance this report should therefore be of particular interest. The problems dealt with include research in the fields of shipbuilding, construction of aircraft, pressure vessels, bridges, railway and highway vehicles, and structures. For each of the 30 committees, sub-committees and panels the original programme of research is given in tabulated form, followed by a report on the work completed, then a list of items of projected work, and a statement of outstanding problems. Among the latter some are taken from the corresponding list published by the American Welding Society in June, 1941. Some of the most important results of five years' research work may be indicated in the following headings, as far as they have some relation to railway engineering.

All-Weld Metal Test Specimens.—It was found that the rate of cooling of the weld metal seriously affects the mechanical properties. The method of depositing the weld metal will be equally important as

the shape of the test piece; acceptance tests for welding electrodes will have to be based on specimens produced by exactly similar methods.

High Tensile Steels were tested on weldability. Steel plates of $\frac{1}{2}$ in. thickness had an ultimate tensile stress of 37-43 tons a square inch and a minimum yield stress of 23 tons a square inch. A memorandum on the weldability of high tensile steels has already proved its value in the manufacture of munitions. The same applies to another memorandum on the welding of high-alloy h.t. steels. The new British Standard Specification No. 968 is mainly based on the result of these investigations.

Welded Constructions.—Actual capacity of compression members in structures with welded rigid joints has been investigated. The method of design for spot welded, statically loaded joints in mild steel has been dealt with in a memorandum prepared by the advisory service on welding, Ministry of Supply.

Fatigue Tests on Welded Connections.—The death of Professor Haigh interrupted the work carried out at the Royal Naval College at Greenwich, but it is hoped to continue the investigations. The list of problems includes questions referring to the fatigue strength of structures and the effects of vibration on their strength.

Standardisation.—Close collaboration with the British Standards Institution resulted already in the publication of 16 British Standard Specifications referring to welding. B.S.S. No. 968 dealing with the welding of high tensile steels has only recently been completed.

The advantages of the welded rigid frame structure, not only in bridge and building construction, but also in railway vehicles' underframes, and so forth, and the increasing importance of welding in railway construction and maintenance has been dealt with previously in THE RAILWAY GAZETTE. The results of five years' welding research clearly confirm the superiority of welding methods as compared with older processes of construction. The picture presented by this report is

most encouraging. The tremendous development in nearly all applications of welding caused by war production has given a strong impulse to welding research and considerable progress may be expected in the future.

RAILWAY ASSESSMENT AUTHORITY REPORT.—The Railway Assessment Authority has issued its annual reports dealing with its work during the year ended March 31, 1942, on the valuation rolls of the four main-line companies and the London Passenger Transport Board. The final supplementary revision of the second railway valuation roll (operative for the quinquennial period 1936-41) was made before the end of the year under review. Appeals against the roll by three of the railway companies were, however, still outstanding. Statistical data as to the second roll are given in an appendix, which shows the original cumulo valuations and total rateable values of the four main-line companies as in 1939, and the corresponding cumulo valuations and total rateable values after the final supplementary revisions of 1941 and 1942, as indicated in the following tables:—

| | Cumulo, 1939 | Cumulo 1941-2 |
|--------------|----------------------|------------------------|
| L.M.S.R. ... | 1,500,000 | 1,491,802 |
| L.N.E.R. ... | 1,100,000 | 1,094,899 |
| G.W.R. ... | 1,400,000 | 1,397,980 |
| S.R. ... | 1,150,000 | 1,140,700 |
| | Rateable value, 1939 | Rateable value, 1941-2 |
| L.M.S.R. ... | £ 329,197 | £ 327,168 |
| L.N.E.R. ... | 252,761 | 251,999 |
| G.W.R. ... | 323,998 | 324,372 |
| S.R. ... | 260,302 | 256,484 |

Reference is made to the appeals heard during the year under review in respect of the first London Passenger Transport valuation roll (operative for the quinquennial period 1936-41). The hearing lasted 25 days and in the result the cumulo net annual value of the board's transport undertaking as entered in the roll as revised is £945,250 and the rateable value £812,132. These figures have superseded pre-existing totals of approximately £1,021,000 net annual value and £822,000 rateable value.

* Published by the Institute of Welding, 1942, London. 79 pages, 8 $\frac{1}{2}$ x 10 $\frac{1}{2}$. Price 5s.

C.P.R. Tunnel at Quebec

C.T.C. apparatus controls points and signals on a line carrying boat-train services and other traffic



Signal bridge with two 3-speed signals

ABOUT 11 years ago the Quebec Harbour Commission brought into use, as part of a 5-year programme of improvements, a new dock and berthing places for the use of large ocean-going vessels and primarily for the *Empress of Britain* and sister ships. This involved the construction of a new railway line connecting the quays with the existing railway facilities; it passed through a single-line tunnel, one mile in length, beneath the Plains of Abraham, and joined at its city end the lines of the C.P.R. and C.N.R. These, which are single lines further out, form a double line from the junction between the two railways on the outskirts, over which the Quebec Central trains also run. Even in normal times the traffic is fairly heavy, apart from the boat-train services running to the dock.

It was decided to adopt the C.T.C. system of control for the new line, the connections thereto and the lines in the vicinity and, of course, track circuiting throughout, as is customary with this class of work in America. The control machine was placed in the Cadorna signal box and, with the rest of the equipment, was supplied by the General Railway Signal Company, Rochester, U.S.A., and installed by the C.P.R. Signal Department, under Mr. E. S. Taylor, Signal Engineer.

The signals are of the single unit, or "searchlight" pattern, much used of recent years in Canada, and give the standard speed-signalling indications adopted by a number of lines in North America. The first illustration shows a signal bridge with two three-unit signals, for high, medium, and slow speed indications respectively; each unit is made capable, if desired, of showing red, yellow, or green, according to track conditions. The two upper units can also be worked in

combination to produce a fourth aspect, where circumstances call for it. Although three units are commonly employed at interlocking locations, all of them are not necessarily workable. Where no high speed movements occur, for example, the top unit is merely a fixed red light. In the second illustration a two-unit signal is seen, controlling the entrance to the tunnel. The lower unit in this case is a permanent red light and the vertical arrangement of the two lights serves to show that the signal is an "absolute" one, that is, it may not be passed in the stop condition without the express sanction of the train dispatcher, with whom the train crew communicates by telephone. There are 42 signal units in the installation.

The points are operated by the "Model 5D" type of point machine; there are 11 in all, with "dual control" mechanism, allowing the points to be worked ordin-

arily from the C.T.C. machine and by hand on the ground, in the case of necessity, of course subject to proper control and, at all times, with full electrical interlocking between the points and signals. The C.T.C. system, by enabling the single-line entrance signals to stand normally at danger, directly under the dispatcher's orders, gives positive control over the traffic and reduces, or even eliminates, the necessity of issuing train orders, thus simplifying the dispatcher's work and that of the trainmen. The Canadian lines have recognised the advantages of this method of working and are now applying it elsewhere on a considerable scale.

The signal apparatus in this installation is worked throughout on d.c., but power is taken in the first instance at 550 volts a.c., 3-phase, from the Quebec Railway Light & Power Company, and stepped down at the signal box to 220 volts; transformers and rectifiers are provided to charge storage batteries at the individual locations along the line.

Although a relatively small installation, this work is typical of many others, some covering considerable lengths of line, brought into service in recent years in North America. Operating conditions are, of course, practically the same in Canada as in the U.S.A. and although in early years a certain amount of signalling approximating to British designs was used at a few large stations the working generally was conducted on American principles, and the single lines which formed the overwhelmingly greater portion of the mileage, were worked on the train dispatching system. Eventually power and automatic signalling of American manufacture was adopted to some extent. As the demand for further facilities has arisen on the more important routes the tendency has been to continue to use equipment that has been found acceptable in the United States. Thus the centralised control of points and signals and the relay system of interlocking have found favour in Canada.



Two-unit "absolute" signal controlling entrance to tunnel

Air Raid Damage to St. Pancras Station, L.M.S.R. (See page 233)



View shortly after bomb damage, showing demolished platform ends and rolling stock



Temporary gangways and part restoration for the early resumption of traffic

RAILWAY NEWS SECTION

PERSONAL

The Minister of Production has appointed Sir Henry Self to be Permanent Secretary, and Sir William Palmer to be Second Secretary, Ministry of Production. Sir Henry Self entered the Civil Service in 1907 and served with the Board of Trade, Post Office, Foreign Office, War Office, and Local Government Board; in 1914 he was seconded to the War Office and Ministry of Munitions, after which he served until 1941 in the Air Ministry and the Ministry of Aircraft Production. He was seconded afterwards to Field-Marshal Sir John Dill in Washington, for special liaison duties in connection with supply.

We regret to record the death, at the age of 64, of Sir Joseph McConnell, Bart., D.L., M.P., a Director of the Belfast & County Down Railway. He was a Deputy-Lieutenant for the City of Belfast, and had been a Member of Parliament at Westminster for the county of Antrim since 1929.

The King has awarded the Imperial Service Medal to Captain Murdoch James, Master, C.G.S. *Laurentian*, Southport, Prince Edward Island.

Mr. W. Davies, Assistant Divisional Superintendent of Operation (Central Division), L.M.S.R., has been elected to Corporate Membership of the Institute of Transport.

Mr. G. Newman has been appointed Assistant District Goods & Passenger Manager, Perth, London Midland & Scottish Railway, in succession to Mr. J. W. Cook, whose appointment as District Goods & Passenger Manager, Aberdeen, was recorded in our issues of July 17 and 24.

Mr. Patrick Ashley Cooper has resigned from his position as Director-General of Finance, Ministry of Supply, for reasons of health. He is succeeded by Mr. John Morison. Mr. Ashley Cooper accepted this post at the invitation of Dr. Burgin in the early days of the ministry; he is a member of the London Passenger Transport Board.

We regret to record the death in West Africa on August 18 of Captain John William Moran, O.B.E., Senior Engineer, Gold Coast Government Railway.

Mr. John O'Dowd, whose appointment as Traffic Manager, Great Southern Railways, Eire, was recorded in our March 13 issue, has retired.

We regret to record the death at Southfields on August 12, at the age of 80, of Mr. Antonio Giet, who had been for many years Secretary of the Buenos Ayres Great Southern Railway Co. Ltd., from the service of which he retired some 22 years ago.

Mr. Gilbert E. Chittenden, Chief Stores Superintendent, South African Railways & Harbours, who, as recorded in our August 21 issue, has been appointed Assistant General Manager (Commercial) in succession to the late Mr. P. D. Troskie, was born in Klerksdorp, Transvaal, in 1892. He received his early education in England, and then returned to South Africa to matriculate at Potchefstroom College, and later passed his Intermediate B.A. examination at the

Union High Commissioner, in the work of re-building South Africa House. Before his return to South Africa in 1935, Mr. Chittenden made extensive tours of investigation into general transport practices, and in particular into railway catering methods, in various European countries, in Canada, and in the United States of America. After his arrival in South Africa he was appointed Assistant Catering Manager, and later he became Catering Manager. His appointment as Chief Stores Superintendent, in which capacity he had been acting already for the previous eight months, dates from January 1, 1941.



Mr. Gilbert E. Chittenden

Appointed Assistant General Manager (Commercial), South African Railways & Harbours

Transvaal University College. He entered railway service on the clerical side in 1911, and served in the Staff, Financial, and Parliamentary Sections of the General Manager's Office at headquarters until 1923, except for a period when he served as a journalist in the Publicity Department, and while he was on active service in East Africa and Europe during the war of 1914-19. During his period of service in the General Manager's Staff Office Mr. Chittenden acted as Secretary of the First Appeal Board. After two years' service as Assistant to Brigadier C. M. Hoffe, the present General Manager, in the office of the Minister of Railways & Harbours and of the Railway Board, he was appointed, in 1925, to be Director of Publicity in London. He held this position for ten years, and his artistic flair and journalistic ability were of considerable account in his successful efforts to establish South Africa's claims to notice as a premier land for travel. While in London he was associated closely with Mr. Charles de Water, the former

We regret to record the death, at the age of 72, of Mr. Charles H. Morrison, Signal Engineer of the New York, New Haven & Hartford Railroad from 1907 to 1940. He had been previously in the service of the Chicago, Milwaukee, St. Paul & Pacific, the Rock Island, and the Erie lines. He was President of the Railway Signal Association (now the Signal Section of the Association of American Railroads) in 1906, and took a leading part in the development of signalling on electric railways. The New Haven adopted single-phase traction and was, it is understood, the first main line in America to use frequency-selective signal apparatus. The adoption of overhead contact wires by his company confirmed him in the opinion he had already formed that to have semaphores pointing away from the track was a mistake, and eventually he persuaded the New Haven to reverse the usual American practice and to adopt the left-hand upper quadrant arm which, with right-hand running, naturally pointed over the track and was not obscured by the traction-structure supports. This has been ever since the New Haven practice, but only a few electric interurban lines copied the example. Mr. Morrison had been engaged for nearly half a century in signalling work.

The Hon. F. C. Sturrock, South African Minister of Railways & Harbours, was received by the King at Buckingham Palace on August 28.

We regret to record the death of Mr. T. S. Finlayson, formerly Chief Locomotive Draughtsman, Southern Railway. He retired in 1937.

Mr. John Ballantyne, O.B.E., has been appointed Services Director, Scottish Region, Ministry of Fuel & Power. He was, until his retirement in 1941, Chief Officer for Scotland, London Midland & Scottish Railway. A biography and portrait of Mr. Ballantyne appeared in our January 10, 1941, issue.

We regret to record the death on August 27, at the age of 66, of Sir Roy Wilson, who in 1928 was Chairman of the Select Committees on Transport in the Western Highlands and Islands of Scotland.

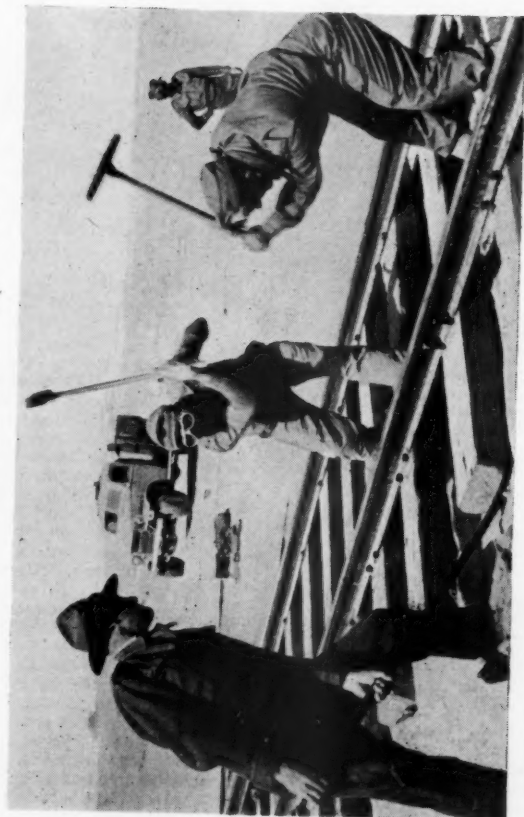
Railways and the War—109



New Zealand troops drilling holes in sleepers



Indian troops packing the track



Spiking the rail to the sleepers

NEW ZEALAND AND INDIAN TROOPS LAYING DESERT RAILWAY TRACK IN LIBYA



One of the American machines used for earth levelling

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TRANSPORT SERVICES AND THE WAR—155

Train Heating

Steam heating on passenger trains in Great Britain (excepting those on long-distance night journeys) will begin on November 1, a month later than usual.

Motorcycle Petrol Ration

The basic petrol ration for motorcycles ceases on October 31. As with motor-cars, one month's grace will be allowed during which motorcyclists may use up any remaining portion of their basic ration, but no extension beyond November 30 will be permitted.

Restaurant in L.M.S.R. Arches

Four L.M.S.R. arches in the Athol Street area, in the centre of Liverpool dockland, have been converted into a British Restaurant, which was opened to the public on August 12, after a formal civic opening on the previous day. Two arches have dining room accommodation for 264 persons; one is a self-service buffet; and the fourth is used for stores and staff rooms. All the arches have inter-communication.

Transport Priority for Workers

Priority on buses and trams for workers is to be given legal effect under an Order, made by the Minister of War Transport, which will come into operation on September 6. The order permits a queue to be broken to give effect to any local scheme for priority to workers. It also prohibits persons from trying to board a vehicle before those waiting in a queue. Pavement markings for the formation of queues are to be regarded as equivalent to barrier rails, and passengers must leave a vehicle at terminal points if asked to do so by the driver or conductor. Priority for workers has been adopted in many provincial places, as recorded from time to time in these columns, but doubt has been cast upon the legality of the schemes. The new order applies only to places where there is a local scheme for priority. It does not authorise general priority.

Rationalisation of Milk Transport

Negotiations have been proceeding for some time with a view to the rationalisation of the transport of milk from the farm to the first destination, in connection with the arrangements whereby from October 1 the Milk Marketing Board will become the sole purchaser of milk from producers, with the exception of milk used by producer-retailers for their own businesses. The Ministry of Food has set up an organisation known as Milk Movements which will choose the destination points, and decide what farms are most suitable to serve these points. When taking over all existing contracts on October 1, the Milk Marketing Board will attach a schedule of collection and delivery points to every contract, and it is probable that many of these schedules will subsequently be altered, in some cases materially, as a result of rationalisation. Advisory committees are being set up in every Milk Marketing Board division, and these committees will include representatives of road hauliers.

Air Raid Damage to St. Pancras Station, L.M.S.R.

St. Pancras Station, L.M.S.R., was one of a number of London passenger stations damaged during the air raiding on the metropolis in 1940-41. The illustrations which we reproduce at page 230 show something of the result of an H.E. bomb

which fell near the buffer stops on May 10, 1941, almost completely destroying the ends of two platforms and forming a large crater. The principal members of the famous arched-roof escaped serious injury, but the glazing was naturally badly damaged, and a large amount of debris was formed. The sub-structure of the station was also affected, as was rolling stock standing in the terminus. At the other end of the station four bombs fell, two of which exploded below ground and formed camoufflets. Another of these bombs caused damage to subsidiary arch work. It was decided by the L.M.S.R. engineers to bridge one camoufflet, and arrangements were made to instal a temporary bridge. The other camoufflet was not so large, and it was decided to fill this. It would have been possible to open two of the tracks in the station in the fourth day, but, in order to expedite the work of resuming full services, it was decided to close the station for a few days, after which all the platforms were reopened with the exception of the two of which the ends had been demolished. These were reopened three days afterwards and access to them was gained by temporary gangways which are shown in our second illustration.

Kenya & Uganda Railways War Effort

In the recently published report of the Kenya & Uganda Railways & Harbours for the year 1941 it is stated that military demands on the services continued to be heavy and the Transportation Department, in particular, was called upon to meet exceptional military requirements which taxed its resources in staff and facilities to their limits. These demands, frequently of short notice, were met expeditiously and efficiently. Special catering arrangements for military moves continued to be made and for some of the moves catering was furnished simultaneously at four separate depots, and this at short notice. Military goods traffic was charged at a flat rate of 8 cents (0.96d.) a ton-mile. Remission of railway freight charges on military traffic, amounting to £351,778, was made during 1941, equal to a remittance of 61 per cent. of the charges on military goods traffic. A further £13,761 was remitted on account of harbours charges. Numerous works involving the construction of stores and workshops and the installation of sidings were undertaken for the military authorities. The mechanical workshops in Nairobi also carried out a large amount of work for the military, particularly in the manufacture of equipment.

Daylight Saving in South Africa

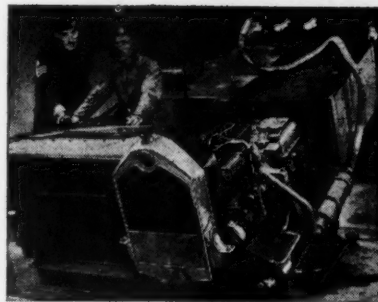
Daylight saving will be brought into operation throughout the Union of South Africa from midnight on September 20 by advancing the clocks one hour, thus bringing the rest of the country into line with the province of Natal, where the scheme has already been applied.

Indian Railway Workers' Hours

Power to suspend the rules restricting the hours of employment of railway servants was given in a Government ordinance issued in New Delhi on August 21.

Ceylon Railway Military Organisation

It has been decided to inaugurate a much larger Railway Military Organisation than was originally intended. The original proposal was to form three companies. The response from railway employees willing to join the Force has been so encouraging



Same job—new pupils

Bob Smith used to put the young drivers through it in the piping days of peace, before he would allow them to take a bus on the road. Today, he is still putting drivers through it—tank drivers, and knowing Bob Smith for 25 years, we fancy they'll learn something about driving by the time he's finished with them.

Meantime, we've got to carry on without him and many like him. Often women have to do men's jobs. We've got to run special services for munitions workers at all hours and in all weathers. And we've got to carry you. So if sometimes you think that the services provided by the bus Companies aren't what they used to be, be tolerant, and remember, they're going to be better than ever they were.



ISSUED BY THE BRITISH OMNIBUS COMPANIES PUBLIC RELATIONS COMMITTEE

One of the series of goodwill advertisements issued by a large group of provincial bus companies

that it has now been decided to increase the size of the Force. The Minister of Communications & Works, Mr. J. L. Kotalawela, has addressed the following letter to the Railway Department on the success of the recruitment to the Corps:—

"Just one month ago I addressed an appeal to you to enlist in certain Military Units of the Ceylon Engineers. My aim then was to recruit sufficient men for all ranks. Up to a week ago more than three times the number of applications for enlistment were received. These figures speak for themselves and are an eloquent tribute to your sense of public spirit and devotion to duty. The response from the Operating and Construction sections, in particular, of the railway has been most gratifying and I have, therefore, decided to expand the Corps to provide three companies in each section. The Workshops Company is yet short by a couple of hundred men and I am sure you will meet this deficiency ere long. You have maintained the best traditions of the Public Services and the result achieved on a system of purely voluntary recruitment is one of which you and I can well be justly proud. I tender my sincere thanks for the co-operation you have given me."

The General Manager of Railways, Mr. W. G. Hills, writing on the same subject in a circular to members of the staff says:

"I am very pleased that the response to the recent appeal for volunteers to enlist in the Railway Military Units has surpassed all expectations. I take this opportunity of thanking all employees who signified their willingness to join the

various units and thereby displayed a high sense of loyalty and devotion to duty. In view of the large number of applications for the Operating and Construction Companies, it has since been decided to form one Operating Company and one Construction Company for each division. The number of volunteers from certain grades, however, is still far in excess of the actual requirements, so that it may not be possible to enrol some of them at present. On the other hand there is a dearth of volunteers for certain other grades and it is hoped that employees in these grades who have not submitted their forms yet will reconsider the matter and join with the least possible delay."

It is understood that the State Council will be asked to vote a sum of Rs. 485,000 for the inauguration of the Railway Military Units.

Summer Time in Unoccupied France

M. Laval has announced that summer time will be maintained in the unoccupied zone of France throughout the coming winter.

Passenger-Fare Increase in Finland

Railway passenger fares in Finland are to be increased by about 20 per cent. from October 1.

Transport in the Bacska Region

The Yugoslav region known as the Bacska consists of a triangle to the north-west of Belgrade bounded on two sides by the Rivers Danube and Tisa. It extends north to the Yugoslav-Hungarian frontier beyond Subotica. This region, which totals some 4,430 square miles and contains 1,024,900 inhabitants, is now in Hungarian occupation. Its railway system, all standard gauge, has a route length of 1,129 km. (701 miles), of which 362 km. (225 miles) are classified as first-class lines. The principal lines are from Zemun to Subotica, 107 miles, forming the Yugoslav section of the Belgrade-Budapest main line; the Subotica-Senta section (24 miles) of the

main line to Roumania; and the Subotica-Sombor-Bogoevo main line (54 miles).

Hungarian troops received the order to invade the country on April 11, 1941, and, when the occupation of the Bacska region was completed, the Hungarian State Railways took control of the railway system owned and formerly operated by the Yugoslav State Railways. Two bridges over the River Danube, two over the River Tisa, five over the River Drava, five over the River Mura, nine over the King Petar Canal, and one over the River Karasica (to the west of Osijek) had been destroyed during the fighting. Three more bridges over the River Drava were damaged on their southern side, close to the Croat bank. Up to December 31, 1941, the Hungarian State Railways had been able to repair two bridges over the Drava, one over the Mura, eight over the King Petar Canal, and the one over the Karasica.

The Yugoslav Forces withdrew as many locomotives and vehicles as possible, and the Hungarian State Railways were compelled to send 44 locomotives into the occupied Bacska to enable a skeleton train service to be worked. It is reported that 3,019 Yugoslav railwaymen were prevented from joining their retreating comrades; 2,725 of them were dismissed by the Hungarians without notice, while 820 railwaymen of Hungarian nationality who had been dismissed by the Yugoslav State Railways after 1918, but who had been allowed to stay in the country, were reinstated by the Hungarians.

Mávauto, the road motor organisation of the Hungarian State Railways, took control of the road services. The Yugoslav Forces had withdrawn all the motorbuses which formerly maintained the road services in the Bacska, totalling 549 km. (341 miles). The Mávauto organisation sent ten buses into the region as a first batch.

Of the 85 road bridges in the Bacska, 68 were destroyed during the fighting, but the Hungarians maintain that they were able to secure undamaged the important Srbobran Bridge over the King Petar Canal,

on the Novi Sad to Subotica motor road, by reason of the intervention of their parachute troops. Of the destroyed bridges, 39 were reconstructed in permanent form by the end of 1941, and 23 were repaired temporarily. Large bridges which the Yugoslav Forces had no time to destroy or damage comprised the road bridge between Virovitica and Barcs, and (in the Eastern Bacska) the bridge crossing the King Petar Canal at Stari Becej, close to the junction of the canal with the River Tisa. Plans have been completed for the reconstruction of a further 18 bridges. The total length of the destroyed bridges aggregated about 10,500 ft., and 60 per cent. of the bridges were longer than 328 ft., and crossed navigable rivers or canals.

A map of the Bacska region was published at page 260 of our issue of February 20 last.

The Railways of European Turkey

The through train operated by the Turkish State Railways from Istanbul to the Bulgarian frontier, connecting with the Bulgarian State Railways, operates to the following schedule:—

| | Down | |
|------------|------|-----------|
| Istanbul | ... | 9 p.m. |
| Adrianople | ... | 7.50 a.m. |
| do. | ... | 7.58 a.m. |
| Svilengrad | ... | 9.3 a.m. |
| | Up | |
| Svilengrad | ... | 4.45 p.m. |
| Adrianople | ... | 5.55 p.m. |
| do. | ... | 6.15 p.m. |
| Istanbul | ... | 6.50 a.m. |

Reduction in Canadian Civil Rail Travel

As from August 31 civilians in Canada have been prohibited from making long distance rail journeys, and all reduced fares for civilian passengers have been abolished. Official warning has also been given that further restriction in the use of railways by civilians may be expected.

U.S.A. Bus Service Co-ordination

The Office of Defense Transportation has ordered the Santa Fe Trail Transportation Company (a subsidiary of the Atchison, Topeka & Santa Fe Railway) and Southwestern Greyhound Lines (a Southern Pacific Railroad subsidiary) to co-ordinate their services between Kansas City, Mo., and Albuquerque, N.M. Under this order, which is based on voluntary plans submitted by the two companies, they are directed to stagger schedules, to use station facilities jointly, where possible, and to eliminate certain journeys. The companies must also recognise each others tickets.

Brazil to British Guiana Links

Plans for building great new highways linking Brazil and British Guiana were announced recently by the Governor of Bahia (Brazil), who visited Georgetown (British Guiana). The roads are intended to develop trade between the two countries and to speed the transport of rubber and other essential products between South and North America as a Brazilian contribution to the war effort of the United Nations. The Governor added that the Brazilian Government was still intensely interested in the 28-year-old project for a railway from Manaos to Georgetown.

Roumanian Air Lines

The Roumanian State Air Lines have recently reopened the following inland and foreign services:—

| |
|---------------------------------------|
| Bucharest—Sofia |
| Bucharest—Galatz—Chisinau—Tiraspol |
| Bucharest—Sibiu—Arad |
| Bucharest—Belgrade—Venice—Milan |
| Bucharest—Arad—Budapest—Vienna—Berlin |



Miss Eileen Kirkham, who is a signalwoman in an L.M.S.R. box in the Midlands. Before taking her course as a signalwoman she served as a porter

Ministry of War Transport Accident Report

South Pelaw Junction, L.N.E.R.: April 20, 1942

Mr. J. L. M. Moore inquired into the accident which occurred at South Pelaw Junction, Pelton, L.N.E.R., on April 20, 1942, on the $7\frac{1}{2}$ mile Annfield Plain to South Pelaw section, which falls sharply and almost continuously from near the former place, and has more than 5 miles of gradients steeper than 1 in 60 and includes short stretches of 1 in 35. On this occasion the 7.5 a.m. mineral train from Morrison Colliery, made up of twenty-one 20-ton, three 17-ton and one 12-ton wagons of coal, with 20-ton brake, weighing 675 tons, drawn by "Q.6" class 0-8-0 tender engine No. 2286, got out of control, due to the failure of one of the main brake rods rendering the steam brake inoperative on engine and tender. After negotiating at 40 to 50 m.p.h. the facing junction at South Pelaw, where the signalman, warned of what was wrong, had set the route for the Pontop mineral branch as the safest course, it became derailed, and the engine overturned. Considerable damage was done and several days elapsed before the junction could be restored. Fireman Walter Stanley was killed, Driver Ernest Ridley fatally injured, and Guard Moses Stephenson severely shaken. Whilst the train was in motion the maximum braking power was approximately 15 per cent. of the total weight; 6.6 per cent. was provided by the steam brake. With the failure of the latter the tender hand brake could give only 0.6 per cent. in substitution and the total figure fell to about 9 per cent.

REQUIREMENTS OF REGULATIONS

The regulations stipulate that all down goods and mineral trains must have a double brake (that is, affecting wheels on both axles) fastened down for every two wagons, and trains stop east of West Stanley Station, itself $2\frac{1}{2}$ miles east of Annfield Plain, and having a length of rising and moderately falling gradient west of it, to enable brakes to be examined and readjusted, if the load of the train is more than half the authorised load for the engine, as in this case. The guard said he had applied the required number of brakes and this is not disputed. He became apprehensive before reaching West Stanley, but heard no whistle signals, because of the noise of the train; other evidence showed they were given. He applied his van brake with maximum pressure until the derailment. The signalman at South Pelaw Junction, receiving the "running away" signal, feared that to allow the train to run on the down grade to Ouston Junction, where there is a sand drag, might result in fouling the York-Newcastle main line, so decided to divert it over a facing crossover to the Pontop line, which is on a rising gradient, and he is held to have acted correctly.

THE BRAKE LINK FAILURE

On the "Q.6" engines the steam brake is actuated by a single cylinder, applying the tender brake by a connecting link, which fractured in this instance, and, the rigging being compensated, all brake power was rendered inoperative. Inspection of the remaining portion showed a visible lamination at one side of the single eye, extending at right angles to the axis of the hole; the defect reached to the other side of the eye, and was present in

tensile tests taken from each side of the shank behind the eye, extending for a length of about 6 in. The specific requirements for Class "A" steel are 24 to 28 tons per sq. in. tensile stress, with 29 to 25 per cent. elongation, and the results obtained were:—

| | | |
|-------------------------|----|------|
| Ultimate stress, tons | 27 | 25.8 |
| Elongation, per cent. | 11 | 17 |
| Reduced area, per cent. | 48 | 55 |

The first result was from the side behind the visible lamination, but the elongation on both test pieces had been reduced, due to this defect, which had been present in the billet from which the rod was forged, due to insufficient material being cropped from the end after rolling. Such a defect is very rare.

INSPECTION OF BRAKE LINKS

Engine No. 2286 left the works in November, 1939, and had run 64,424 miles; 55,000 miles is the minimum required between general repairs; no maximum is laid down. The brake link, as far as can be traced, had not been changed or repaired since. These links are annealed and inspected for flaws when engines are in for general repairs, seldom require attention otherwise, and are not subject to periodical examination. In the ordinary course they possess the ample factor of safety of over 9. The failure appears to have been due entirely to the unusual defect in the material, and as no previous ones can be traced, Mr. Moore

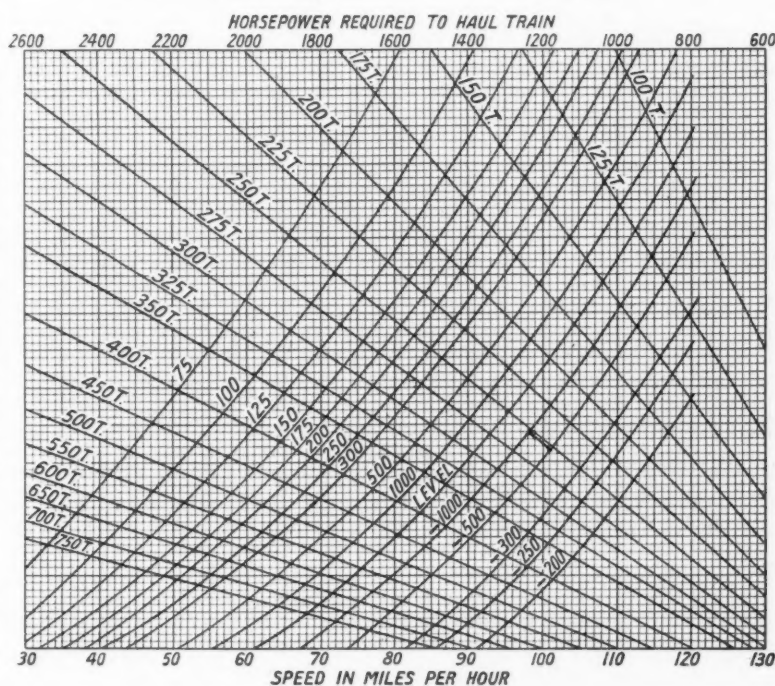
does not suggest modifying either present works treatment or running-shed examination. He also sees no justification in practice for objecting to the form of construction of the brake rigging, although theoretically not desirable. Modern practice is, however, to use separate engine and tender brake cylinders.

INSPECTING OFFICER'S RECOMMENDATIONS

On a review of all the facts and taking into consideration the rules in force on the section concerned, Mr. Moore finds no fault with the driver and is satisfied that the wagon brakes were correctly applied. It is also possible that the engine was reversed, but damage prevented this from being known with certainty. He recommends, however, that consideration be given to the question whether the timing of 29 min., allowed for the $7\frac{1}{2}$ miles from the starting point at Annfield Plain to South Pelaw is altogether consistent with the low speed required, and the necessity for slow speed might be brought more tangibly to drivers' notice by an appropriate appendix speed restriction, to be strictly enforced.

SCINDE, PUNJAB & DELHI RAILWAY ANNUITIES.—The 786 miles of the Scinde, Punjab & Delhi Railway Company were purchased by the Government of India under the powers of an Act of 1886, which provided for the purchase by means of annuities, namely, Class "A" representing capital and interest, and Class "B." It is now notified that on June 30, 1942, a total sum of £3,631,083 was invested for the purpose of providing a sinking fund in respect of the Annuities Class "B."

Comparing Locomotive Performances



Graph prepared by Mr. W. A. Tuplin, D.Sc., to facilitate comparisons of locomotive runs over lines with widely-divergent characteristics. (See editorial note, page 219)

Detection of Flaws in Engineering Materials

The detection of flaws or cracks in ferrous or non-ferrous materials has always presented a problem to those engaged in engineering production, not only to manufacturing concerns and inspection staffs, but equally in railway shops where new and repair operations are continuously undertaken on locomotives and rolling stock vehicles. Many methods of detection have been put forward from time to time, and the most successful of these has been the magnetic one for use with ferrous materials; no really satisfactory way, however, has previously been devised for the examination of non-ferrous substances, although many have been tried, chief among them being anodising and the oil and chalk or dye and chalk methods. Both depend upon the assumption that the crack or flaw can be filled with chromic acid or oil, which after a time will seep out and stain the chalk surface in the neighbourhood of the crack. All these methods have a common base in that they depend on close visual inspection under a light which illuminates the article uniformly, including the crack or flaw in it. This inspection demands skilled labour which is subject to a considerable amount of eyestrain. There is an ever-present danger of faulty material being passed as perfect.

The use of ultra violet light and fluorescent materials offers a new approach to the problem. A non-fluorescent material illuminated with ultra-violet light will appear black or purple according to the nature of the material, a crack or flaw in that material if filled with a fluorescent filler, will glow with a characteristic colour—in effect, the crack or flaw is filled with light, while the remainder of the specimen remains dark.

THE "GLO-CRACK" SYSTEM

The system to which the name "Glo-Crack" has been given, and for which the Colloidal Research Laboratories Limited is responsible, makes use very successfully of this phenomenon. It is a development of the B.A.B. system of fluorescent lighting applied to the detection of flaws or cracks in engineering materials. The fundamental principle is identical; the fluorescent solution is illuminated by what is termed "black light," that is, ultra-violet light.

The specimens, pressings, stampings, etc., to be examined are immersed for an automatically controlled period in a bath of fluorescent material at a temperature of 75° C. The specimens are withdrawn and then washed in a solution which removes all fluorescent material that has not become anchored to the edges of the flaws or cracks. Examination under a "black" lamp (a source of ultra-violet light) immediately shows any flaws or cracks. Surface scratches which have a depth only equal to, or less than, their width are not shown. The total time taken to examine in this way a large specimen, such as a piston, does not exceed three minutes.

THE PLANT AND METHOD OF USING IT

A demonstration was recently given in London of the working of the plant, and at the same time specimens were available for examination. We attended this demonstration and found it of considerable interest; the impression was that the system does its work with the utmost thoroughness and by simple means, econ-

omising in time and labour. On enquiry we learned that it is available for materials and parts of almost every kind both in the initial and manufactured state, and could be used for such objects as locomotive crank axles, tyres, or other components. The plant shown at the demonstration was of the single batch or tray type, but others are available utilising conveyors for continuous processing to keep pace with the requirements of the production line. The operation is entirely automatic, and the current consumption on the model shown is only 1 kw.

The materials which are the core of the system are solvents which efficiently perform their primary function of maintaining the fluorescent material in solution, and of carrying it into the flaws or cracks. They also efficiently and thoroughly degrease any specimen immersed in them. The fluorescent treatment loss is approximately 0.23 galls. per 1,000 sq. ft. of specimens, and the washing solution loss approximately 0.17 galls. per sq. ft. At the prices ruling today, this works out at under one penny per sq. ft. treated. In a continuous plant further economies can be effected by the addition of solvent recovery plant.

The advantages of the system can be summarised as follows: (1) can be used with equal efficiency on ferrous or non-ferrous materials; (2) positive detection, without eyestrain; (3) degreases the specimens, thus telescoping two operations; (4) can be used by unskilled labour; (5) no staining of the specimens; (6) specimens require no additional treatment, such as de-magnetising or cleaning; (7) extreme simplicity and cheapness.

Civil Engineers and the Building Industry

The first of a series of conferences to discuss the problems of post-war building was held on August 25 at the Institution of Civil Engineers, Great George Street, Westminster, S.W.1. The Chairman of the conference was Professor C. E. Inglis, and the speakers consisted of representatives of the various aspects of the building industry—engineers, architects, master builders, and building operatives.

Professor Inglis, in his introductory remarks, said that the title adopted for the conference, "Civil Engineers and the Building Industry," was more comprehensive than concise, but the vagueness was intentional, because the primary objective was to give expression to a growing conviction that engineers in the past had not taken sufficient interest in the building industry; they were to consider how such errors of omission could now be rectified in the light of changed conditions and the tasks of unprecedented magnitude which lay ahead. He stated that it was hardly necessary to emphasise the important part building construction was now playing in our war effort, and that it was destined to play an even greater part in the period of reconstruction.

After the war, building and the construction of public works would assuredly form a large proportion of our national effort, and such work should go a long way to counteract the menace of post-war industrial depression. Since the control of supplies, so essential at present, must inevitably continue for some years after the war, it was of supreme importance that engineers, architects, and builders

should make every effort to offset the scarcity of materials by the highest possible efficiency in their designs, in their methods of construction, and in the use of materials. Realising these objects, the institution had invited the many interests to join it in considering the subject in all its aspects. In general, what the engineers wanted to know was, assuming they had not played their full part in the past, how can they contribute most effectively to the common objective? But it was not to hear the views of engineers that this meeting was convened, but rather to receive home truths from external sources.

Lord Portal, Minister of Works & Planning, said we should prepare for the future and put our house in order. The various sections of the building industry should work in harmony with one another. For some time after the war there would still be control of materials, but the building industry had the advantage of using chiefly native products. There should be an adequate scheme of apprenticeship and education for those entering the building industry, and the workmen should be assured of continuity of employment. Architects, engineers, and builders should formulate a plan and reorganise the industry to cope with the problems facing them.

Mr. W. H. Ansell, President of the Royal Institute of British Architects, began by saying that the conference should not be so much concerned with the prosperity of the building industry as with what the building industry could produce in beauty and utility. He said there was a difference between civil engineering and building.

Mr. H. T. Holloway, President of the Federation of Civil Engineering Contractors, said it had always been a debatable problem whether civil engineering and building were separate industries or one industry, but in his opinion they were separate industries. He gave several reasons for this opinion, one being that civil engineering projects, such as docks, harbours, roads, and railways, were based chiefly on unskilled and semi-skilled labour, whereas in building craftsmanship was the dominant factor. Mr. Holloway thought that the system of free competitive tendering was a serious drawback to the building industry. Architects, he also said, had need of engineers, as they were not competent themselves to design engineering services, and he suggested that it would be better if architects employed engineering consultants, rather than leave the designs to engineering sub-contractors.

Five further meetings will be held on the subjects outlined in the present conference; the last meeting will be on January 5, 1943.

ROAD DEVELOPMENT IN COLOMBIA.—The road construction programme now under consideration by the Colombian Government, includes five new highway links of importance. Three of these are already approved. One is the section between Abrego and Chiriguana (Santander del Norte and Magdalena) giving a direct route between Bogota and the Caribbean ports. Another is the section between Cucuta, Sardinata, and Abrego, and a third will complete the road between Cartagena and El Carmen, the link in the Sahagun-Medellin route. The fourth link, Bahia-Solano-Atrato River, will be important as a connection of the Pan-American Highway, and the fifth is that between San Augustin and Coconuco.

L.M.S.R. Paper Reclamation

Much is heard nowadays about paper salvage, but the reclamation and re-use of paper, and the prevention of its unnecessary use, are subjects which have received less attention. The London Midland & Scottish Railway has given a great deal of attention to the latter aspects of the matter, and many years ago established an office, one of whose functions was to keep a check on the demand which is apt to occur in large organisations for more records and forms, and whose work resulted in the company being able immediately to face the wartime paper restrictions. By May, 1940, it had effected a reduction of 20 per cent., excluding advertising, but including the wartime suspension of 2,700 items.

To a great extent a company marches on its forms, and therefore a proper diet is necessary; if it is overfed its system becomes cumbersome, but if it is underfed the system may break down. To restrict the use of paper and to prevent its being used unnecessarily, the L.M.S.R. has introduced many features, such as centralised control of design, purchase, storage, distribution, and printing; flexible systems of control records; standard qualities, weights, and sizes; and a planned system of purchase in bulk against expected requirements.

Moreover, before any new form is authorised, the proposer is required to answer searching questions as to its need, and his attention is directed to a paragraph reading: "Before making this proposal to establish a new form or revise an existing form, it should be recognised at the outset as potentially a proposal permanently to increase the already very heavy expenditure, not only in regard to the cost of printing, but also in regard to cost of compilation, and before the department commits itself to this course every existing means to meet the case must be demonstrated as wholly inadequate. The company is admittedly the gainer by every constructively usable form provided it is used constructively; forms of any other character are without any economic value in the company's records. To assist in reaching a sound sustainable conclusion in the premises this form is furnished to the departments, and the resources of the Executive Research Office placed at their disposal."

PIONEER WORK

The L.M.S.R. was the pioneer in setting up two Stationery Reclamation Depots, one in London, employing 75 women and four men; the other in Glasgow, with a staff of 36 and one respectively. Into these depots come the files of old documents from the 65 salvage centres of the system, and these are sorted into re-usable paper and non-usable paper. The former is sorted into standard sizes and returned to stationery stores to be distributed against requisitions for plain-paper items. Some of the sizes found are cut up into smaller ones; and in some cases used portions are cut away, leaving the remainder for re-use. Sheets large enough for making into envelopes are sent to manufacturers, and by this means the company is obtaining a million envelopes a month, which contain on the inside the details of former records, but which serve their purpose as well as new ones.

As already mentioned, the L.M.S.R. system is divided into 65 salvage centres, to which, by arrangement, the various stations and depots send their salvage of all descriptions. The various types of paper are sorted at these centres,

and that suitable for the Stationery Reclamation Depots is sent to them; but paper which already has been used fully is sent for pulping, and so finds its way into munitions.

Sir Francis Joseph on Post-War Trade

Sir Francis Joseph, in a recent broadcast to Canada, the United States, Australia, and South Africa, on "Private Enterprise and Collective Security," predicted that a state of emergency would exist after the war for many years in every country. Private enterprise was likely to be the best means to straighten out the tangle. To use private enterprise was most likely to prevent chaos developing during the time Governments were trying to reach agreements. Private enterprise existed in every civilised country. It took risks. It got things done and done cheaper than the State. Having done the job, it handed over to the State that portion of its profits which taxation imposed on it. Plainly expressed, it did the job while Governments and committees would still be talking about it and disputing the best way of doing it.

"Why," he asked, "the contempt or suspicion about working on a profit-making basis? The guiding principle of every trade union leader is 'How can I get more for my men?' The only fiction about it is that we term the increased reward to workers as wages, but what is paid to the employer we call 'profit.' Both are profits."

"The troubles of the world today are largely because private enterprise has not been fully used by Governments. The

success of private enterprise is dependent on goodwill between nations. It allows merchants to serve their customers abroad by sending them the goods they want, and also by bringing back the goods of that country; thereby increasing the standard of living of the people of both countries. In so doing they make a profit. Why not? Governments should be glad of profits. Unless private enterprise made a profit the volume of social services could not be maintained. The profit motive, if successful, assures Governments that they can borrow money both at home and abroad.

"The best illustration is that the profits of private enterprise in the form of foreign investments enabled us to get through 1914-19, and since 1939 has provided the funds to pay for the invaluable food and munitions from U.S.A. and foreign countries prior to the introduction of the Lease-Lend policy. The best way a Government can act is to inspire private enterprise to beat past records. This assures the Government of taxes which will maintain social services and help distressed nations to get to work again after the war.

"The acid test is: Does the Government do the job better and cheaper than private enterprise? Nations are subject to the same laws as individuals or firms. You must balance your budget. If not, your credit abroad must suffer, and your money will buy less.

"Governments in trade do not get value for money simply because they lack the experience which private enterprise has had to pay for in tears and sweat. Everything has to be done in a hurry. Nobody bothers about the cost; not even the Government."



An exhibition of garden produce was held on August 27 by the L.M.S.R. London District Passenger Manager's Department. Left to right: Major H. E. Roberts (London District Passenger Manager), Sir Thomas Royden (Chairman), and Sir William Wood (President), who were among the visitors

Some 1,000 persons visited the show, which contained 212 exhibits arranged in 23 classes. At the close of the exhibition, Major Roberts auctioned the exhibits, and £9 11s. 0d. was raised for the comforts fund for men in the Forces (and their dependents) from the Euston District Passenger Manager's staff

Notes and News

Pan-American Highway.—Over 1,000 yards of the Pan-American Highway, which runs along the coast of Peru, were damaged recently as the result of a severe earthquake.

Erste Brüner Maschinen-Fabrik Gesellschaft, Brno.—This company returned for 1941 a net profit of Kc. 5,500,000, and Kc. 1,200,000 was carried forward from 1940. A dividend of 5 per cent. was paid on the share capital of Kc. 65,000,000; this was the first dividend to be paid since 1930.

Danzig Tramways.—It is reported that 51 per cent. of the share capital of the Danziger Elektrische Strassenbahnen is owned by the Danzig municipality, and that 34.6 per cent. is in the hands of the Allgemeine Lokalbahn und Kraftwerke A.G. of Berlin. The company operates both tram and motorbus services.

Scottish Motor Traction Co. Ltd.—After the confirmation by the Court of Session of the reduction of the capital of this company, repayment was made on August 14 to stockholders on the register at that date, of 25 per cent. of the capital of their holdings of ordinary stock. The stock is now transferable in units of 5s. stock instead of units of £1 stock as formerly.

New L.P.T.B. Mobile Canteen.—To enable the board's staff to have cooked meals in greater comfort during inclement weather, a new type of mobile canteen, designed in conjunction with, and built by, the Westminster Carriage Co. Ltd., has been placed in service. A special feature is the dining compartment at the rear, which is separated from the kitchen by a partition with a door and hinged counter.

Orange Luxury Coaches (Portsmouth) Limited.—A general meeting of the members of this company, now in voluntary liquidation, will be held at 725, Lordship Lane, Wood Green, N.22, on September 21, at 11 a.m., to receive the account of the liquidator showing how the winding-up of the company has been conducted and its property disposed of; and to pass an extraordinary resolution as to the disposal of the books, accounts, and documents of the company.

Anglo-Spanish Clearing Office.—In a Circular, No. 10, issued by the Board of Trade under the date August 16, 1942, the Controller of the Anglo-Spanish Clearing Office reminds persons in the United Kingdom to whom earnings of a revenue nature have accrued in Spain since March 31, 1939, that facilities for the transfer of such amounts are available, and creditors are invited to submit particulars to the Clearing Office, after ensuring that their debtors in Spain have made the necessary applications for the transfers.

North Central Wagon Co. Ltd.—Net revenue for the year to June 30, 1942, from rents and other profits after providing for administration expenses and general charges was £69,165 (£81,611), and dividends and interest from investments amounted to £13,863 (£17,174). After debenture interest, directors' fees, and a tax provision of £32,600 (£43,775) the balance of profit for the year is £18,422 (£18,437). Dividend on the paid up ordinary share capital of £225,000 is 7½ per cent., less tax, against 5 per cent., less tax, and the amount to be carried forward is £18,126, compared with £16,467 brought in.

In the year to June 30, 1941, revenue from rents and other profits included £15,452 in respect of the final 15 months' trading of the Lincoln Wagon & Engine Co. Ltd.

Local Railways in Bohemia and Moravia.—It is understood that the companies owning the lines from Stauding to Stramberk, 18.4 km. (11.4 miles), and from Stramberk to Verovice, 6.3 km. (3.9 miles), respectively, have amalgamated; the new company is known as Eisenbahn A.G. Stauding-Stramberk-Wernsdorf, and its share capital has been converted from Czech to German currency.

Lancashire & Yorkshire Wagon Co. Ltd.—For the year to March 31, 1942, the profit, after making provision for interest on loans, depreciation, taxation, E.P.T., etc., was £11,057 (£10,738). The dividend is 16s. a share, or 8 per cent., plus a bonus of 4s. a share, or 4 per cent., comparing with 16s. a share and no bonus for the previous year. The amount carried forward is £30,271 (£29,215).

The "Fougasse" Painting Book.—Reference was made to this book in our June 19 issue, in which it was stated that the proceeds from its sale would be devoted to the Honourable Company of Master Mariners and the Merchant Navy comforts service. We are informed now that a payment of £573 17s. 7d. has been made to each of these bodies, on behalf of Fougasse and The Tilling Association Limited, and representing the profits arising from the sale of the first edition.

Metropolitan Assented Stock.—Glyn, Mills & Co., the trustee and registrar, announces that the funds in its hands available from the recent payment on account of interest on the underlying London Passenger Transport Board "C" stock are not considered sufficient to justify an interim payment on the Metropolitan Assented Stock for the year to December 31, 1942, and will be carried forward towards the payment of the interest for the year ending on that date which falls due not later than May, 1943.

Canada Steamship Lines Limited.—Total revenue for 1941 was \$17,243,806 which exceeded that of 1940 by more than \$4,500,000 and was the highest since 1928. Expenses were \$10,666,846, and the net profit of \$1,551,554, after charging depreciation \$1,630,244 (\$1,404,099), interest \$595,160, and taxes \$2,800,000 (\$780,000) compares with \$956,409 for 1940, and was the highest since 1920. The net profit covered bond interest 8.3 times, after depreciation. After payment of \$2.50 dividend on the preferred, an amount of \$978,429 was added to earned surplus, which is carried forward at \$1,760,429.

Kenya & Uganda Road Motor Services.—The Kenya & Uganda Railways & Harbours Administration operates a road motor service for passengers and goods over a length of 75 miles between Masindi Port and Butiaba, providing connection between Lake Kioga and Lake Albert, water connection between these lakes not being possible on account of rapids. It also works the Masindi Town—Hoima feeder service and a collection and delivery service at Masindi Town. Total revenue in 1941 of the road and feeder services amounted to £11,582, of which £9,173 came from goods traffic. Direct expenditure was £10,178, exclusive of the contribution of £2,381 to renewals fund. Public tonnage conveyed was 20,532, and the number of passengers carried was 27,637. In 1940 total revenue was £7,522 and total direct

expenditure £12,539. Passengers numbered 30,229, and public goods tonnage was 13,540. The inland route to the Sudan was used to an increasing extent throughout 1941.

Doubling the Gotthard Line.—The Swiss Federal Railways Administrative Council has approved a credit of frs. 5,149,000 for the doubling of the Rivera-Bironico-Taverne section, 8.8 km. (5.5 miles) of the Gotthard line. Work on the Taverne-Lugano and Sisikon-Fluelen sections is approaching completion, and the only remaining single-track portion between Immensee and Lugano will be that from

British and Irish Railway Stocks and Shares

| Stocks | Highest 1941 | Lowest 1941 | Prices | |
|------------------------------------|-----------------|----------------|---------------------|---------------|
| | | | Aug. 28, 1942 | Rise/ Fall |
| G.W.R. | | | | |
| Cons. Ord. | 43½ | 30½ | 45½ | + ½ |
| 5% Con. Pref. | 109½ | 83½ | 107 | — |
| 5% Red. Pref. (1950) .. | 105½ | 96½ | 105 | — |
| 4% Deb. | 113½ | 102½ | 108½ | — |
| 4½% Deb. | 115 | 105½ | 109½ | — |
| 4½% Deb. | 121½ | 112 | 114½ | — |
| 5% Deb. | 132 | 122 | 127½ | — |
| 2½% Deb. | 70 | 62½ | 74½ | — |
| 5% R.C. Charge | 129½ | 116 | 125½ | — |
| 5% Cons. Guar. | 128 | 110½ | 123 | — |
| L.M.S.R. | | | | |
| Ord. | 17½ | 11 | 20½ | — |
| 4% Pref. (1923) | 53 | 33½ | 53½ | — |
| 4% Pref. | 68½ | 48½ | 69½ | — |
| 5% Red. Pref. (1955) .. | 97½ | 77 | 99½ | — |
| 4% Deb. | 105½ | 97 | 103½ | — |
| 5% Red. Deb. (1952) .. | 110½ | 106½ | 109½ | — |
| 4% Guar. | 100 | 85½ | 99½ | + 1 |
| L.N.E.R. | | | | |
| 5% Pref. Ord. | 3½ | 2½ | 3½ | — ½ |
| Def. Ord. | 2 | 1½ | 2 | — |
| 4% First Pref. | 52½ | 33 | 52½ | + ½ |
| 5% Second Pref. | 19½ | 10 | 22½ | — |
| 5% Red. Pref. (1955) .. | 79½ | 52 | 87½ | — |
| 4% First Guar. | 90½ | 74½ | 91½ | — ½ |
| 4% Second Guar. | 80½ | 59 | 81 | — |
| 3% Deb. | 79½ | 68½ | 79 | — |
| 4% Deb. | 104 | 91½ | 102½ | — |
| 5% Red. Deb. (1947) .. | 106 | 102½ | 104½ | — |
| 4½% Sinking Fund Red. Deb. | 103½ | 99½ | 103½ | — |
| SOUTHERN | | | | |
| Pref. Ord. | 65½ | 43½ | 66 | + 1 |
| Def. Ord. | 15½ | 9 | 16½ | — |
| 5% Pref. | 107 | 77½ | 105½ | — |
| 5% Red. Pref. (1964) .. | 107 | 89½ | 107½ | + ½ |
| 5% Guar. Pref. | 128 | 111 | 123 | — |
| 5% Red. Guar. Pref. (1957) | 114½ | 107½ | 110½ | — |
| 4% Deb. | 112 | 102½ | 107 | — |
| 5% Deb. | 130½ | 119 | 126½ | — 1 |
| 4% Red. Deb. (1962- 67) | 108½ | 102 | 108½ | — |
| 4% Red. Deb. (1970- 80) | 108½ | 102½ | 107½ | — |
| FORTH BRIDGE | | | | |
| 4% Deb. | 99½ | 90½ | 105 | — |
| 4% Guar. | 99 | 85½ | 103½ | — |
| L.P.T.B. | | | | |
| 4½% "A" | 120½ | 109½ | 114½ | — |
| 5% "A" | 130½ | 115½ | 123½ | — |
| 4½% "T.F.A." | 103½ | 99½ | 100 | — |
| 5% "B" | 117 | 102 | 114½ | — |
| "C" | 46½ | 28½ | 47 | + 1 |
| MERSEY | | | | |
| Ord. | 24½ | 19½ | 22 | — |
| 4% Perp. Deb. | 100 | 90 | 99 | — |
| 3% Perp. Deb. | 73½ | 63 | 77 | — |
| 3% Pref. Pref. | 58 | 51½ | 59 | — |
| IRELAND | | | | |
| BELFAST & C.D. | | | | |
| Ord. | 4 | 4 | 9 | — |
| G. NORTHERN | | | | |
| Ord. | 14½ | 3 | 23½ | — |
| G. SOUTHERN | | | | |
| Ord. | 14½ | 5 | 15½ | + 1½ |
| Pref. | 17 | 10 | 21 | + ½ |
| Guar. | 44 | 16 | 42 | + 1 |
| Deb. | 61 | 42 | 64 | — 1 |

§ ex dividend

OFFICIAL NOTICES

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Monday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

OVERSEAS EMPLOYMENT: Traffic Inspectors are required by the West African Government Railways for the duration of the war or one tour of 12 to 24 months, whichever is the shorter period. Salary: £400 rising to £560 a year. Separation allowance for married men is £128 on salary of £400. Outfit allowance £25. Free passages, free quarters and medical attention. Candidates should have had good all-round training on a British railway and have had experience on inside and outside work, preferably in operating and commercial departments. Written applications (no interviews), giving particulars of age, training, experience, and qualifications, together with name of present employers, should be sent to The Secretary, Overseas Manpower Committee (Ref. 401), Ministry of Labour & National Service, Hanway House, Red Lion Square, London, W.C.1.

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Brunnen to Sisikon, 6.9 km. (4.3 miles), which will require considerable tunnelling. Beyond Lugano there is single track for 3.8 km. (2.3 miles), between Melide and Maroggia, including the dam and bridge across the Lake of Lugano.

Seville Trams.—The Tranvías de Sevilla, a company belonging to the Compañía Sevillana de Electricidad, reports that, despite increased receipts totalling Pesetas 11,250,000 for 1941 (compared with Ptas. 9,600,000), the working profit declined to Ptas. 13,890,000 from Ptas. 15,490,000 in 1940. After allocation to reserves, etc., aggregating Ptas. 5,000,000 (the same as in 1940), there was a net profit of Ptas. 6,010,000, against Ptas. 5,810,000 for 1940. A dividend of 6 per cent. was paid, the same as in 1940.

Furka-Oberalp Electrification.—The electrification of this metre-gauge system was described in *THE RAILWAY GAZETTE* of May 1, when the dates of electrification of the Brig-Oberwald and Disentis-Andersmatt-Realp sections were given. Work on the gap between Realp and Oberwald now has been completed, and electric operation commenced on this portion with the seasonal re-opening on July 1. The whole route (97 km.) now is operated on the 11 kV single-phase system, as are also the connecting Schöllenen, Visp-Zermatt, and Rhaetian Railways.

New South Wales Government Railways.—The report of the Commissioner for Railways for the quarter ended December 31, 1941, shows the following comparative particulars:—

| | 1940 quarter | 1941 quarter |
|--------------------------------|-----------------|-----------------|
| Miles open | 6,141½ | 6,127 |
| Earnings | £5,926,716 | £6,830,062 |
| Expenditure | £3,847,237 | £4,542,636 |
| Train-miles | 8,238,668 | 9,003,755 |
| Earnings per train-mile ... | 14s. 4½d. | 15s. 2d. |
| Expenditure per train-mile ... | 9s. 4d. | 10s. 1d. |
| Operating ratio, per cent. ... | 64.91 | 66.51 |
| Passengers | 48,156,588 | 55,041,359 |
| Goods, tons | 4,193,102 | 4,662,830 |
| Livestock, tons | 215,065 | 229,664 |

Coaching earnings in the quarter to December 31, 1941, were £2,905,307, against £2,432,718 for the corresponding period of 1940, and merchandise earnings rose from £3,217,712 to £3,594,089.

Havana Terminal Railroad Company.—Holders of this company's 5 per cent. mortgage debentures and debenture stock will receive on October 1 the instalments of interest due on July 1, 1934, to January 1, 1937, inclusive, together with interest thereon at the rate of 5 per cent. per annum, from the respective due dates to September 30, 1942. Payment will be made in London in sterling or at the option of the holder in New York at the rate of \$4.86 per £ sterling. It is also announced

that the central management and control of the company have been transferred to the U.S.A. The registered office of the company is 17, Battery Place, New York City.

L.N.E.R. Aids Land Fertility Scheme.—The L.N.E.R. has found that the sludge deposit from its many locomotive water-softening plants has a beneficial effect on the fertility of the soil and the Ministry of Agriculture has registered the L.N.E.R. as an approved producer and supplier of this commodity under the Government Land Fertility Scheme.

U.S. Class I Railway Earnings.—Class I railroads of the United States in the first five months of 1942 had an estimated net income, after interest and rentals, of \$211,500,000 as compared with \$119,435,615 in the corresponding period last year, according to the Bureau of Railway Economics of the Association of American Railroads. Net railway operating income, before interest and rentals, was \$432,926,692, against \$340,467,042. Operating revenues in the five months totalled \$2,657,010,921, compared with \$1,969,286,695 in the same period in 1941, an increase of 34.9 per cent. Operating expenses amounted to \$1,778,782,474, against \$1,379,374,356, an increase of 29 per cent.

German Locomotive Building Industry.—The 1941 report of Krauss-Maffei

A.-G. (Munich), states that the company was able to fulfil its programme for the year. The gross profit for 1941 amounted to RM. 1,450,000, after deduction of wages and salaries, taxation, depreciation, and other items. A sum of RM. 263,000 was allocated to interest service (RM. 516,000 in 1940), and RM. 300,000 was absorbed by additional taxation; after the addition of RM. 363,000 carried forward from the previous year, the resulting net profit amounted to RM. 1,250,000 (compared with RM. 950,000 for 1940). A dividend of 6 per cent. was paid for 1941 on the share capital of RM. 13,000,000 (originally increased from RM. 7,000,000 to RM. 10,000,000; and later further increased by another RM. 3,000,000), compared with the dividend of 8 per cent. for 1940 on the then share capital. A sum of RM. 434,000 was carried forward. The company's reserves aggregated RM. 3,780,000, compared with RM. 3,510,000 at the end of 1940; and liabilities, at RM. 10,670,000, were less by RM. 9,080,000 than for the preceding year. Banking debts, totalling RM. 7,940,000, and accepted bills, totalling RM. 3,290,000, at the end of 1940 had been paid off. Liquid funds totalled RM. 240,000 (RM. 65,000 at the end of the previous year) and bank deposits RM. 530,000.



Colonel Sir Charles Hambro, Chairman of the Great Western Railway Company, firing a Northover Projector when attending a recent inter-company competition of the 38th County of London (G.W.R.) Home Guard at Southall

Railway Stock Market

Firmer conditions ruled in Stock Exchange markets, where earlier in the week sentiment was assisted by more favourable views of the latest turn in war developments. British Funds more than held recent gains, and in fact there was a fairly widely-spread improvement in values, although subsequently the tendency became more cautious; the disposition was to await the trend in the war news from Egypt. Investment securities reflected the better market conditions, and moved higher in some cases; stock was very tightly held and consequently in very small supply in the market. Home railway junior stocks showed moderate response to the better tendency, but most of the prior charges were unchanged on balance. It is realised, however, that yields offered by the main-line debentures compare favourably with those on other high-grade investments, and that they are attractive holdings for investors requiring a portion of their capital to be in sound stocks offering a higher yield than gilt-edged securities. The high yields on home railway junior stocks, to which reference has been made on numerous occasions, do not, of course, indicate any doubts as to the maintenance of dividends at the same rates as those paid last year. The high yields reflect the fact that the disposition is for Stock Exchange values to discount the future a very long way ahead, and there is, of course, uncertainty as to the

manner in which transport may be organised after the war. On the other hand, it is possible that, as to industrial shares, the market is not yet assessing adequately the extent of the problems and difficulties that may have to be faced by many trades in the post-war period. In any case, it would seem that, either home railway junior issues, yielding around 10 per cent., are undervalued, or that industrial shares, many of which now yield less than half this rate, are overvalued at current prices. Rather more attention has been given to securities of South American railway companies, and they were better in some instances. Nevertheless, in numerous directions, prices have not shown as good improvement as that recorded in other sections of the market. The following table gives particulars of some stocks as to highest and lowest prices in 1941, the level ruling at the beginning of January last and also current prices:

| | 1941 high | 1941 low | Early 1942 | Current |
|--------------------------------|-----------|----------|------------|---------|
| Antofagasta 5% Pref. ... | 34½ | 17 | 32 | 41 |
| Arg. Gt. Western 5% Debts. 51 | 20½ | 20 | 50 | 46½ |
| Arg. N.E. "C" Debts. ... | 7½ | 4 | 7½ | 10½ |
| B.A. Gt. Southern 5% Pref. 28½ | 10 | 27 | 25½ | 25 |
| B.A. & Pacific 4% Debts. ... | 70½ | 52 | 69 | 69½ |
| B.A. Western 4½% Pref. ... | 21½ | 6½ | 21 | 20 |
| Central Argentine 6% Pref. 28½ | 10½ | 25½ | 22 | 22 |
| Entre Rios 4% Debts. ... | 12½ | 14½ | 12 | 39½ |
| Leopoldina 5½% Pref. ... | 9½ | 1½ | 9 | 15½ |
| Untd. of Havana Debts. ... | 14½ | 1½ | 14½ | 25½ |

As to movements in individual securities, Great Western ordinary, which was

45½ a week ago, has improved to 46 at the time of writing; the guaranteed and debenture stocks remained at 123 and 108½ respectively. L.M.S.R. ordinary was better at 20½, and the senior preference had a firmer appearance at 70, and the 1923 preference improved from 53½ to 54; the 4 per cent. debentures were again 103½ and the guaranteed stock 98½. There were few movements among L.N.E.R. issues; the second preference was better at 22½, as was the first preference at 53. On the other hand, L.N.E.R. first guaranteed eased from 92 to 91½, and the second guaranteed remained at the lower level of 81 made last week. Southern preferred remained in favour, and has further improved from 65½ to 66½, and the deferred was 16½, compared with 16½ a week ago. London Transport "A" and "B" fully held recent gains, and the "C" rose further from 46½ to 47½.

Where changed, South American railway stocks showed only small gains on balance. United of Havana debentures, however, moved up from 22 to 25½ under the influence of the payment on account of interest arrears on Havana Terminal debentures. The latter have been marked up sharply in price; further interest payments are expected in due course, due to improving conditions in Cuba. Central Argentine issues were firm, and the 5 per cent. debentures were again better at 39. San Paulo ordinary was 55½, compared with 54 a week ago. Canadian Pacific were little changed.

Traffic Table and Stock Prices of Overseas and Foreign Railways

| Railways | Miles open 1941-42 | Week Ending | Traffic for Week | | No. of Weeks | Aggregate Traffic to date | | | Shares or Stock | Prices | | | | |
|--------------------------------|-----------------------|----------------|--------------------|---------------------------------------|--------------|---------------------------|----------------|-------------------------|-----------------------|-----------------|----------------|------------------|-------------------|--|
| | | | Total this year | Inc. or Dec. compared with 1941 | | Totals | | Increase or Decrease | | Highest 1941 | Lowest 1941 | Aug. 28, 1942 | Yield % (Note) | |
| | | | | | | This Year | Last Year | | | | | | | |
| South & Central America | | | | | | | | | | | | | | |
| Antofagasta (Chili) & Bolivia | 834 | 23.8.42 | £ 27,920 | + £ 7,950 | 34 | £ 722,920 | £ 623,390 | + £ 99,530 | Ord. Stk. | 10½ | 3½ | 10½ | Nil | |
| Argentine North Eastern ... | 753 | 22.8.42 | ps. 243,900 | + ps. 37,700 | 8 | ps. 1,732,700 | ps. 1,596,900 | + ps. 135,800 | Ord. Stk. | 4 | 1 | 4½ | Nil | |
| Bolivar ... | 174 | July, 1942 | 3,970 | + 175 | 29 | 31,401 | 26,867 | + 4,534 | 6 p.c. Deb. | 5 | 5 | 10 | Nil | |
| Brazil ... | ... | ... | ... | ... | ... | ... | ... | ... | Bonds | 8 | 2½ | 16 | Nil | |
| Buenos Ayres & Pacific | 2,807 | 22.8.42 | ps. 1,382,000 | + ps. 124,000 | 8 | ps. 10,604,000 | ps. 10,691,000 | - ps. 87,000 | Ord. Stk. | 7½ | 1½ | 5 | Nil | |
| Buenos Ayres Great Southern | 5,080 | 22.8.42 | ps. 2,130,000 | + ps. 16,000 | 8 | ps. 15,791,000 | ps. 15,791,000 | - ps. 30,000 | Ord. Stk. | 10½ | 3½ | 8 | Nil | |
| Buenos Ayres Western | 1,930 | 22.8.42 | ps. 777,000 | + ps. 24,000 | 8 | ps. 6,015,000 | ps. 5,966,000 | + ps. 49,000 | Ord. Stk. | 9 | 2½ | 7½ | Nil | |
| Central Argentine ... | 3,700 | 22.8.42 | ps. 2,061,000 | + ps. 286,250 | 8 | ps. 15,411,700 | ps. 13,442,300 | + ps. 1,969,400 | Ord. Stk. | 8½ | 2½ | 6½ | Nil | |
| Do. ... | ... | ... | ... | ... | ... | ... | ... | ... | Dfd. | 9½ | 1 | 3 | Nil | |
| Cent. Uruguay of M. Video... | 972 | 22.8.42 | 19,658 | - 1,846 | 8 | 154,592 | 168,266 | - 13,674 | Ord. Stk. | 9½ | 1½ | 5½ | Nil | |
| Costa Rica ... | 262 | July, 1942 | 12,761 | - 11,815 | 52 | 12,761 | 24,576 | - 11,815 | Stk. | 15½ | 1½ | 13½ | Nil | |
| Dorada ... | 70 | June, 1942 | 17,669 | + 4,469 | 25 | 81,215 | 75,300 | + 5,915 | 1 Mt. Db. | 97 | 97 | 88½ | Nil | |
| Entre Rios ... | 808 | 22.8.42 | ps. 294,300 | - ps. 1,360 | 8 | ps. 2,175,900 | ps. 2,414,700 | - ps. 238,800 | Ord. Stk. | 6½ | 1 | 5½ | Nil | |
| Great Western of Brazil | 1,030 | 15.8.42 | 9,200 | + 1,800 | 33 | 325,200 | 295,400 | + 29,800 | Ord. Sh. | 11½ | 1½ | 5 | Nil | |
| International of Cl. Amer. ... | 794 | June, 1942 | \$115,937 | - 85,230 | 25 | \$844,687 | \$673,300 | + \$171,387 | Ord. Stk. | 11½ | 1½ | 5 | Nil | |
| Interoceanic of Mexico | ... | ... | ... | ... | ... | ... | ... | ... | 1st Pref. | 1 | 6d. | 1 | Nil | |
| La Guaira & Caracas... | 22½ | July, 1942 | 6,950 | - 1,080 | 29 | 44,940 | 43,245 | + 1,695 | Ord. Stk. | 4 | 1 | 5 | Nil | |
| Leopoldina ... | 1,918 | 15.8.42 | 31,697 | - 1,275 | 33 | 976,199 | 814,164 | + 162,035 | Ord. Stk. | 4 | 1 | 5 | Nil | |
| Mexican ... | 483 | 21.8.42 | ps. 275,200 | - ps. 24,700 | 8 | ps. 2,243,400 | ps. 2,235,800 | + ps. 7,600 | Ord. Stk. | 4 | 1 | 5 | Nil | |
| Midland of Uruguay ... | 319 | June, 1942 | 14,640 | - 804 | 49 | 167,105 | 151,608 | + 15,497 | Ord. Stk. | 4 | 1 | 5 | Nil | |
| Nitrato ... | 382 | 15.8.42 | 5,975 | - 2,718 | 7 | 115,541 | 77,332 | + 38,209 | Ord. Sh. | 66½ | 1½ | 3½ | 3½ | |
| Paraguay Central ... | 274 | 14.8.42 | \$3,154,000 | + \$168,000 | 8 | \$28,545,000 | \$28,178,000 | + \$367,000 | Pr. Li. Stk. | 43½ | 29 | 47½ | 12½ | |
| Peruvian Corporation | 1,059 | July, 1942 | 79,801 | - 14,251 | 4 | 79,801 | 65,550 | + 14,251 | Pref. | 6½ | 1½ | 15½ | Nil | |
| Salvador ... | 100 | June, 1942 | c 46,000 | - c 10,000 | 50 | c 1,005,172 | c 799,683 | + c 205,489 | Ord. Stk. | 52 | 24½ | 55½ | 3½ | |
| San Paulo ... | 153½ | 9.8.42 | c 40,259 | - 1,266 | 32 | c 1,148,334 | c 1,194,099 | - 45,765 | Ord. Stk. | 1 | 6½ | 1½ | Nil | |
| Taitai ... | 160 | July, 1942 | 6,490 | + 3,310 | 4 | 6,490 | 3,180 | + 3,310 | Ord. Sh. | 1 | 6½ | 1½ | Nil | |
| United of Havana ... | 1,346 | 22.8.42 | 28,411 | + 7,206 | 8 | 307,497 | 151,733 | + 155,764 | Ord. Stk. | 2½ | 1 | 4½ | Nil | |
| Uruguay Northern... | 73 | June, 1942 | 1,019 | - 130 | 49 | 14,286 | 13,960 | + 326 | Ord. Stk. | 2½ | 1 | 4½ | Nil | |
| Canada | | | | | | | | | | | | | | |
| Canadian National ... | 23,562 | 21.8.42 | 1,568,400 | + 402,000 | 34 | 45,136,200 | 36,969,800 | + 8,218,400 | Ord. Stk. | 13½ | 7½ | 11½ | Nil | |
| Canadian Pacific ... | 17,049 | 21.8.42 | 939,200 | - 92,000 | 34 | 31,476,200 | 26,498,400 | + 4,977,800 | Ord. Stk. | 13½ | 7½ | 11½ | Nil | |
| India | | | | | | | | | | | | | | |
| Barisi Light ... | 202 | June, 1942 | 12,908 | - 2,467 | 13 | 39,600 | 51,990 | - 12,390 | Ord. Stk. | 345 | 253 | 349½ | 5½ | |
| Bengal & North Western | 2,090 | July, 1942 | 261,600 | - 5,267 | 18 | 1,080,300 | 1,092,128 | - 11,828 | Ord. Stk. | 101 | 95½ | 94 | 4½ | |
| Bengal-Nagpur ... | 3,267 | 20.5.42 | 298,800 | + 52,717 | 7 | 1,436,900 | 1,289,290 | + 147,610 | " | 105½ | 101½ | 99 | 7½ | |
| Madras & Southern Mahratta | 2,939 | 30.6.42 | 212,550 | + 3,338 | 13 | 1,945,373 | 1,858,969 | + 86,404 | " | 342 | 290 | 351½ | 4½ | |
| Rohilkund & Kumaon | 571 | July, 1942 | 58,275 | + 3,099 | 18 | 234,300 | 272,651 | - 38,351 | " | 100 | 87 | 94 | 3½ | |
| South Indian ... | 2,402 | 20.6.42 | 179,171 | + 43,616 | 12 | 1,376,295 | 1,113,057 | + 263,238 | " | ... | ... | ... | ... | |
| Various | | | | | | | | | | | | | | |
| Beira ... | 204 | June 1942 | 71,394 | - 9,878 | 38 | 672,109 | 67,066 | + 38,801 | Prf. Sh. | 1½ | 29½ | 2½ | Nil | |
| Egyptian Delta ... | 607 | 10.7.42 | 9,878 | + 2,295 | 15 | 105,867 | 67,066 | + 38,801 | B. Deb. | 68 | 45 | 37½ | 9½ | |
| Manila ... | ... | ... | ... | ... | ... | ... | ... | ... | Inc. Deb. | 90½ | 86½ | 89½ | 6 | |
| Midland of W. Australia | 277 | June, 1942 | 24,804 | + 8,872 | 46 | 254,760 | 183,856 | + 70,904 | " | ... | ... | ... | ... | |
| Nigerian ... | 1,900 | 30.5.42 | 49,805 | - 6,156 | 9 | 453,619 | 438,613 | + 15,006 | " | ... | ... | ... | ... | |
| Rhodesia ... | 2,442 | June, 1942 | 488,130 | - 793,090 | 13 | 4,306,101 | 9,945,447 | - 483,262 | " | ... | ... | ... | ... | |
| South Africa ... | 13,291 | 4.7.42 | 793,090 | + 366,183 | 15 | 10,428,739 | 8,391,343 | + 2,037,396 | " | ... | ... | ... | ... | |
| Victoria ... | 4,774 | Mar., 1942 | 1,339,304 | + 366,183 | 37 | 10,428,739 | 8,391,343 | + 2,037,396 | " | ... | ... | ... | ... | |

Note. Yields are based on the approximate current prices and are within a fraction of ½. Argentine traffic is given in pesos
 † Receipts are calculated @ 1s. 6d. to the rupee
 § ex dividend